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ACTIVITIES OF THE MARKETING AND FACILITIES RESEARCH BRANCH

DURING THE FISCAL YEAR ENDED JUNE 30, 1951

UNITED STATES DEPARTMENT OF AGRICULTURE
PRODUCTION AND MARKETING ADMINISTRATION
WASHINGTON, D. C.

AGRICULTURE—WASHINGTON

ORGANIZATION OF THE MARKETING AND FACILITIES RESEARCH BRANCH

William C. Crow, Director

Budd A. Holt, Deputy Director

MARKETING FACILITY PLANNING IN SPECIFIC LOCALITIES

C. J. Otten, In Charge

Develops plans and promotes the construction of the proper kinds of marketing facilities for all kinds of farm and food products at various stages in the marketing channel in specific localities; determines the type, size, location, design, cost, and method of financing and operation best suited for the specific locality; and determines the financial soundness of the proposed facility.

MARKETING FACILITY AND MATERIALS-HANDLING PRINCIPLES

W. H. Elliott, In Charge

Conducts studies to determine the principles that should be followed in ascertaining the proper size, layout, location, and method of financing and operating marketing facilities, and to determine the best kind or kinds of equipment for use in handling products at various stages in the marketing channel. The principles developed are followed in planning marketing facilities and equipment to fit specific localities and areas.

TRANSPORTATION FACILITIES, EQUIPMENT, AND LOADING METHODS

J. C. Winter, In Charge

Conducts research on transportation for all types of agricultural commodities including but not restricted to studies and investigations of transportation facilities, methods, equipment, practices and operations, and studies of transportation legislation, policies, and regulations in order to increase transportation efficiency, reduce costs, improve quality, and generally to expand the distribution of farm and food products

MERCHANDISING, PACKAGING, AND OTHER MARKETING FUNCTIONS

R. W. Hoecker, In Charge

Conducts research on merchandising, packaging, wholesaling, retailing, storage, or other subjects where the emphasis is primarily on the function rather than on the commodity in order to increase efficiency, reduce costs, improve quality and consumer acceptability, and generally to expand the distribution of farm and food products.

TECHNICAL PROGRAMS

K. J. McCallister, In Charge

Conducts studies and investigations to develop technical improvements which will increase the effectiveness of market news, inspection, and grading programs.

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SUMMARY

The Marketing and Facilities Research Branch is engaged in finding ways to improve the efficiency and hold down the costs of marketing farm and food products. Its program consists primarily of (1) Developing plans for and promoting the construction of efficient facilities for the physical handling of farm products in producing areas, concentration points, and terminal and secondary markets; (2) improving the transportation of these products from one place in the marketing system to another; (3) finding ways to make more productive the labor that is used in handling these products by determining the best kind of equipment for performing each handling operation and the most efficient way of using such equipment; (4) finding improved methods of wholesaling, retailing, and packaging; and (5) developing improvements in the market news and grading services so that better information will be available to guide the marketing processes. The improvements in marketing efficiency that result from this program bring better returns to farmers, provide consumers with higher quality products at more reasonable prices, and enable the private marketing system to do a more efficient job of taking to the consumers of the Nation the products which can be produced in such great abundance on its farms.

During the fiscal year there has been greater interest than ever in the fields of work conducted by the Branch. Never before has there been as wide acceptance of the findings and recommendations of the Branch by persons engaged in marketing. This increased interest in greater marketing efficiency is no doubt due to a great extent to the emergency conditions facing the country which make it necessary to do the marketing job with less labor, less waste of the commodities, and reduced amounts of all kinds of resources. Another reason for the greater acceptance and adoption of the findings of the Branch by the marketing system is the cumulative effect of the work that has been done in previous years. Research in marketing is a fairly new activity in the Department of Agriculture, and it naturally has taken a few years for the Branch to turn out a significant volume of work and for people in the marketing system to gain knowledge of and confidence in the work that is being done. The fact that this confidence is growing is shown not only by the wider adoption of its recommendations but also by the fact that marketing agencies throughout the country in larger numbers than ever have requested the Branch to work with them and use their facilities as laboratories for its studies. During the year no research undertaking was carried on except on the basis of a definite request that the work be done.

This Branch confines its research to marketing problems that cut across commodity lines. A large portion of the problems in the marketing field are common to many commodities. In dealing with such problems the work can be done most efficiently by working on a cross-commodity basis. For instance, transportation facilities must be planned and used to accommodate a great variety of commodities. Many kinds of warehouse facilities are used to store numerous products, and the main problems of warehouse operation are essentially the same regardless of the commodity handled. Wholesale marketing facilities handle a great variety of commodities purchased by

retail stores. Retail stores, of course, handle several thousand items, and the individual retailer cannot be concerned to any great extent with any one commodity but is more interested in improvements which will affect the handling of a large number of commodities. The kinds of materials-handling equipment needed and their use depend largely on the nature of the marketing facilities, the volume handled, and the size and weight of the package rather than on the commodity contained in the package. Many aspects of the market news and grading programs cut across commodity lines. Furthermore, in dealing with many marketing problems, results which have been developed by means of research on one commodity can, with very little adaptation, be applied to other commodities and commodity groups. It is for these reasons that there is a need for cross-commodity work at numerous places in the marketing channel where the commodity involved is not the primary cause for investigation or where the action taken will affect many commodities.

This summary of activities of the Branch for fiscal year 1951 has been prepared in order to record the work that was done. At the end of this report will be found a list of all the recent publications of the Branch. These publications, of course, report more fully on the individual projects that are discussed herein. Most of the work of the Branch was done in cooperation with other agencies and groups that are concerned with marketing. The Branch worked extensively with State departments of agriculture and bureaus of markets, State agricultural colleges, municipalities, various trade organizations that are concerned with marketing, farmers and farm organizations, transportation agencies, equipment manufacturers, engineering firms, and other groups concerned with improving the efficiency of distributing farm and food products.

MARKETING FACILITIES PLANNED

During the year a great deal of work has been done in planning and promoting the construction of satisfactory market facilities in places where existing facilities have become outmoded and inefficient. Twenty-two projects in this field were active during the year, and, as the year closed, new wholesale market districts were nearing completion in four major cities--San Antonio, St. Louis, Columbia, S. C., and Hartford. The facilities being constructed in these four cities will cost about 10 million dollars, and the improvements in distribution that will result from their use will effect savings of several million dollars annually. Two of these markets are being built by private corporations owned largely by members of the trade, while the other two are being built by public benefit corporations created by legislative act. The completion of the facilities in these four cities will bring to 15 the total number of improved market facilities that have been built since this program of assistance in developing plans for improved facilities began. Studies have been made and plans developed for about 20 other localities where construction has not yet started. In a number of these places work is under way toward carrying out the recommendations that have been made. In Boston, for instance, where a 14-million-dollar facility for the wholesale handling of fruits, vegetables, meats, poultry, eggs, and related products was recommended in a report issued a year ago, a public benefit corporation has been created to build the facilities recommended on the site proposed, and the engineering firm which was employed to develop the detailed plans has its report almost completed. Similarly, in Richmond the

engineering firm which was employed by the Market Authority created to build the market has completed its plans and turned them over to the Authority. Plans and financing arrangements have been completed for the Indianapolis market, and construction is expected to start there at any time. It is expected that many of these 20 localities in which studies have been made and for which plans have been developed will carry out the recommendations within the next few years.

New market facility studies were completed during the year in five localities--four in the States and one in Puerto Rico. The facilities proposed for Puerto Rico consist of docks, wholesale stores for handling every type of food, feed, and related products, a meat-packing plant, a grain elevator, feed mill, a farmer's market, and a public retail market. These facilities will cost about 9½ million dollars to construct but will handle a large part of the agricultural products grown in Puerto Rico together with most of the imports of foods to the Island. The Government of Puerto Rico has appropriated some funds to make possible the employment of engineers to draw up the detailed plans and specifications for the facilities proposed in the report of the Branch.

It is interesting to note that although there has been more construction of marketing facilities during the past year than at any time since the work began, there has been little or no difficulty in obtaining the materials necessary for this construction. Wholesale market facilities for the handling of food consist mostly of one-story buildings and open sheds. These structures can be built from any one of a variety of materials so that large quantities of materials in short supply are not needed. To illustrate, stores can be built of concrete, concrete blocks, cinder blocks, brick and clay blocks, or other materials. The roof of a building can be supported by steel or wooden trusses. The columns to hold up the roof can be made of brick, reinforced concrete, steel, or timber. The floors should be made of concrete, and it is desirable to have reinforcing steel in them, but there is considerable choice in the kind and amount of steel that is required for this reinforcement. The farmers' sections of markets ideally should consist of concrete platforms under metal roofs, but it is possible to build the roof of other materials or to leave it off until some later time. Then farmers' markets can operate with nothing but parking spaces laid out on the pavement. Under these conditions the economies in labor, materials, and food supplies that result from the construction of satisfactory market facilities far outweigh the small amount of materials in short supply that may be required for their construction.

MARKET FACILITY RESEARCH

In an effort to gain more knowledge of how to plan satisfactory market facilities to meet the needs of specific localities, a number of research projects were carried on during the year to develop principles that should be followed in planning such facilities. One study was completed which sought to find the best possible arrangement of railroad tracks at stores of wholesale produce markets so that the cost of unloading products from cars into stores could be minimized without at the same time increasing the cost of construction of the market facilities. Studies were also made to determine the relation between the volume of commodities handled and the amount of floor space needed in wholesale establishments; to determine the

best layout for wholesale frozen food stores; to determine the correct design for tomato and banana repacking facilities; to find out how todetermine the proper size, location, and design of country elevators; toascertain the most satisfactory methods of financing and managing wholesale produce markets; to determine what factors are essential to the success of wholesale markets for perishables in producing areas; and to determine the kind and layout of facilities and handling equipment that will most efficiently handle poultry and eggs. It is impossible to develop the best plans for market facilities in producing areas, concentration points, and terminal and secondary markets for all kinds of farm and food products without a great deal of research to determine how to locate, design, and operate such facilities in the best manner. Since this is a new field, much remains to be done in developing the necessary know-how.

IMPROVED HANDLING METHODS AND EQUIPMENT

For the marketing system to be efficient it is necessary not only to have the proper kind of market facilities at various points in the marketing system but also to have the right kinds of equipment to move commodities into, within, and out of these facilities and to use such equipment properly. Farming has been mechanized to a great degree with resulting increases in efficiency in production. Manufacturing has been highly mechanized, but in the distribution of farm and food products there continues to be much use of manual labor, handling products at many stages in the marketing system one package at a time. Very little attention has been given to the adoption of labor-saving devices in the handling of farm and food products in the marketing channel. Indeed, more than half the total cost of marketing goes to pay the wages of labor. The productivity of this labor used in marketing can be increased materially by providing it with satisfactory equipment with which to work, and many handling operations are performed which are not necessary at all with proper marketing facilities. With increasing wage rates and shortages of labor, there is growing pressure to provide labor with the necessary kinds of equipment to permit it to increase its productivity. Unless this labor in the marketing channel can be made more productive and unnecessary handling operations eliminated, it probably will be impossible to halt the trend toward higher marketing costs with higher prices to consumers and lower returns to growers.

In the materials-handling field, the Branch is working on certain segments of the marketing system where there seems to be an excessive use of hand labor with a minimum use of labor-saving devices. An effort is being made to determine the comparative efficiency of different types or combinations of types of materials-handling equipment for the physical handling of packages of farm products in packing houses, processing plants, stores, and warehouses; to determine the amounts of equipment needed for the most efficient handling of specific quantities; and to develop improved methods of using materials-handling equipment for performing these operations. Most of the work in this field is being conducted on a case study basis.

During the year, materials-handling research was carried on in stores and warehouses of wholesale fruit and vegetable distributors, in commercial apple packing and storage warehouses, in cotton warehouses, and in receiving rooms of milk plants. In the fruit and vegetable stores improved methods of handling products into,

within, and out of warehouses were developed and the results of these findings were made available to the industry. One development in this field which is illustrative of the work was the use of recording and transcribing equipment for use in loading out delivery trucks which made it possible for two men engaged in the loading-out operation to perform the same amount of work formerly done by three. Other studies in fruit and vegetable stores during the year dealt with the comparative efficiency of different types of equipment for unloading and placing bananas in storage, the comparative efficiency of different types and combinations of types of equipment for loading-out operations in warehouses of service wholesalers, the possibility of joint or cooperative ownership of equipment by small dealers in wholesale markets, and an appraisal of several methods currently being used for cutting, weighing, and packing bananas for distribution.

In the commercial apple packing and storage warehouses of the Pacific Northwest, data are being obtained through time studies of labor requirements for the handling of four types of packages of apples with 10 different types or combinations of types of materials-handling equipment. It is expected that the improved handling methods that will be developed in these case studies can, with little additional work, be applied to the operation of apple packing houses in other parts of the country and to the packing of other commodities similarly handled in producing areas.

A study has been conducted to find ways of reducing the cost of handling milk in receiving rooms of Indiana milk plants. In this study existing receiving arrangements were analyzed and new arrangements in work methods developed which provide greater operating efficiency. Twenty receiving rooms were studied, and the existing methods, together with the improved methods that were developed, were measured by time-and-motion studies. The improved arrangements were tested under actual operating conditions.

The study of materials handling in cotton warehouses, which was begun in the summer of 1949, has as its objective finding the most efficient ways of handling cotton into, within, and out of cotton warehouses, where much manual labor has been used in the past. In this study, for each important type of cotton warehouse, an effort is being made to find out for varying volumes of cotton handled the kind of equipment that is best suited for the handling operation and the best way of using such equipment so that the total labor cost of operating cotton warehouses may be reduced. Short reports are being issued from time to time pointing out ways to reduce the cost of performing specific operations. One of these reports pointed out improved methods of stacking cotton; another showed how to weigh cotton more efficiently; and still another showed how to reduce by more than half the amount of labor required to move cotton from the storage area to the compresses. During the past year, 232 time studies were made in 55 different cotton warehouses located in 44 cities throughout the Cotton Belt. When the study has been completed, an over-all report will be issued which can be used as a guide by all cotton warehousemen in determining the kind of handling equipment that will most satisfactorily meet their needs and the best way of using such equipment so that they can hold down the cost of handling cotton in their warehouses.

WORK ON WHOLESALING AND RETAILING

The Agricultural Marketing Act of 1946, in recognition of the fact that about one-third of the cost of marketing of farm and food products goes for retailing and that it is in the retail store that consumers decide how much, if any, of a commodity will be purchased, directed the Department to conduct marketing research to help find ways to improve retailing operations. Thus, until recently, little or no work has been done by the Branch in this field. In an effort to make sure that any work done in wholesaling or in retailing will be productive in finding answers to problems of wholesalers and retailers, a merchandising advisory committee consisting of wholesalers and retailers was appointed and its recommendations have been followed in all the work now being carried on. While this work is new, a great deal has been accomplished during the year in obtaining the interest and cooperation of wholesalers and retailers, and some worthwhile research results have already been achieved. Three national trade organizations in the wholesale and retail field are now working with the Branch on specific studies, as are a large number of individual wholesale and retail organizations.

In January 1951, the report on the study of the check-out operation in retail self-service food stores was released. Before the end of June, the check-out counter which was developed in this study had been installed in more than 1,000 retail stores. One national chain has adopted it as standard equipment, while others are experimenting with it. Hundreds of local chain stores and independent firms have requested plans and details of the counter, and many of them have already installed it. The use of this improved check-out method not only increases the productivity of the checker by 38 percent, but by moving customers through the counters more rapidly it results in less congestion on the parking lot and in the store.

During the year, a great deal of time has been devoted to a study of methods of receiving groceries in retail stores, marking prices on individual items, and stocking the shelves. This study has developed ways to increase the productivity per man-hour in the operation involved by some 60 to 85 percent over the methods that were formerly used in the stores where the studies were made. Increased efficiency in receiving the groceries was obtained primarily by introducing wheel-type roller conveyors in the place of 2-wheel and 4-wheel trucks and by changing the arrangement of the back room of the stores. Four methods of price-marking merchandise that are ordinarily used were analyzed, and the improvements introduced resulted in increases of from 56 to 90 percent in the number of cases price-marked per hour. In stocking shelves it was found that employees frequently lifted the item from the floor with one hand, passed it to the other hand, and placed it on the shelf, stocking on the average 22.6 cartons per man-hour. By using a 4-wheel truck to bring the products to the shelf and using the hands properly it was found that 29.4 cartons could be handled per man-hour, and through the use of a new leaf-type shelf, developed as a part of the study, production was increased further to 34.3 cartons per man-hour--a total increase of 52 percent over the old method.

Another department in the retail store which uses a great deal of labor and which has been a source of considerable dissatisfaction to customers is the meat department. About the middle of the fiscal year a study was undertaken in cooperation

with two retail store organizations to find improved ways of handling meat in retail stores whether it is handled on a service or self-service basis. The staff of the Branch was augmented for this research by the assignment of an equal number of persons from the cooperating retail organizations. It is expected that this study will develop less costly ways of handling meat with both service and self-service selling, but it is too early to be able to report any results.

Work has been continued on the prepackaging of meat, poultry, and other animal products. As of January 1, 1951, it was estimated that 2,800 retail food stores had complete self-service meat operations, while an additional 8,000 were operating partially on a self-service basis. Two years earlier only 400 food stores in the United States had complete self-service meat departments. The principal study conducted on prepackaging during the year was for the purpose of determining the costs of and reasons for rewrapping prepackaged meat, poultry, and cheese. This study showed that from 7 to 11 percent of the products offered for sale in prepackaged form required rewrapping. The principal reasons for this rewrapping in the order of their importance were the necessity of making price changes, discoloration, unattractive packaging, and broken film. The study shows the amount of rewrapping that was necessary for each type of product, the reasons for this rewrapping, and its cost, and concludes by pointing out several ways to reduce the amount of rewrapping that is necessary.

Another project in the merchandising field that was completed during the year was a study of the effect on sales of orange juice of merchandising with mechanical dispensers. This study showed that sales were about 18 percent greater when the juice was sold from mechanical dispensers than when it was sold from jugs; that small stores tend to have better sales from dispensers than the large stores; and that fountain managers agree that the dispensers are more efficient than the jugs in serving the juice. Other merchandising studies measured preferences of consumers for buying oranges by weight or count in selected cities, their preferences for buying in packages or in bulk, and the type and size package which was in greatest demand.

During the latter part of the year, a study was undertaken of the utilization of shelf space in retail stores. Preliminary observations revealed great disparities among commodities and stores in the relationship between the amount of shelf space devoted to an item and its sales. An experiment was begun which has as its objective determining the effect on sales of the display of varying numbers of rows of items in the shelves in order to determine the relation between shelf space used and sales volume. This experiment will not be completed until about the middle of the next fiscal year.

Pursuant to the recommendations of the advisory committee, three new lines of work were inaugurated during the year to determine how wholesale and retail distributors of food can improve their operating efficiency by working together. It has been observed that by proper wholesaler-retailer cooperation both wholesalers and retailers are able to do a better job of distributing farm and food products. This study is aimed at determining in what areas such cooperation is most productive and what are the best ways of carrying out such joint undertakings.

Attention is being given to the possibilities of improving marketing efficiency by reducing delivery costs, the cost of handling and filling orders, and the cost of loading, and by improved pricing procedures, informational aids, and assistance in improving layout. By the end of the year, several case studies had been made of individual wholesalers who appear to have been especially successful in developing one or more improvements in efficiency by working closely with retail outlets. A report will be prepared pointing out some methods and practices that appear to have been most satisfactory in order that such practices may be adopted by other wholesale and retail organizations.

TRANSPORTATION ACTIVITIES

The Branch's work in transportation is aimed at developing improved transportation facilities, methods, equipment, practices, and operations in order to increase transportation efficiency, reduce transportation costs, and protect the quality of products while they are being transported. The work carried on during the year falls into three general categories: (1) Getting better utilization of transportation equipment; (2) developing improvements in the various types of transportation equipment; and (3) research into methods of loading, stowing, bracing, and shipping agricultural commodities.

Serious car shortages over the year emphasize the importance of obtaining better utilization of carrier equipment, particularly of boxcars, for the transportation of agricultural products. These shortages can be alleviated by making better utilization of existing equipment or by placing more equipment into service. If the situation is met by making better utilization of existing equipment, the problem can be solved quicker and without the use of critical materials to build additional equipment. Furthermore, this type of solution is better for the railroads because it holds down their investment in facilities. On the basis of the study of the actual movement of 36,000 carloads of commodities by rail, a sample formula has been developed for the measurement of delays through the use of data available to the carriers. This statistical unit, called a "movement ratio," is simply a device for determining what proportion of the time a loaded car is moving and how much of the time it is standing still. By use of this statistical unit it is hoped that the railroads can find whether the idle time of loaded cars is increasing or decreasing and where the greatest delays are being experienced in order that they may take appropriate corrective action. In order to test the practicability of this formula and make it available to such railroads as might be interested in using it, the formula and its application were explained to the presidents of approximately 50 of the principal railroads hauling agricultural commodities. Replies received up to this time from these officials indicate considerable interest in the formula and the possibilities that it has for aiding in bringing about improved utilization of railroad equipment.

During the year several projects have been carried on in the field of improving transportation equipment. One of these is a continuation of the work to improve refrigerator cars so that they can maintain the low temperatures that are desirable for the transportation of frozen foods and, by applying either heat or cold as needed, provide uniform temperatures. Tests have been conducted on the transportation

of frozen foods from Florida to northern markets. The most satisfactory performance was given by two mechanically refrigerated cars, one equipped with gasoline-powered units and the other with a single Diesel-operated unit. In each of these cars the commodity temperatures were maintained within 1/2 of 1 degree of the loading averages, and the maximum temperature encountered in any part of these cars was 4°. Two cars, refrigerated with dry ice, gave satisfactory results, maintaining commodity temperatures at or slightly below the temperatures at the time of loading. The report covering the results of these tests was in the hands of the printer at the close of the fiscal year. The results of experimentation with these newer types of equipment have been sufficiently satisfactory that refrigerator car lines now have in service or on order about 200 mechanically refrigerated cars.

A number of tests were also conducted on the performance of refrigerated motortrucks used in the transportation of frozen foods. The earlier tests conducted showed that although the refrigerating units in the trucks had ample capacity for providing the uniform temperatures desired, the circulation of air was often inadequate. As a consequence, in some parts of the load temperatures at destination would be as high as 16° or 18° instead of the zero temperature desired. The experiment showed that certain changes were needed inside the truck and in methods of loading in order to provide the necessary air circulation. With these modifications adopted, later tests showed that the hot spots had been virtually eliminated, and while the trucks were en route the average commodity temperatures were actually reduced slightly. A report setting forth the findings of these truck tests and making recommendations as to how to improve truck refrigeration was completed and sent to the printer before the end of the year.

Work progressed during the year in an attempt to find more efficient ways of loading and unloading grain into railroad cars and trucks. Many elevators lack efficient equipment for unloading grain from cars at low cost. If some inexpensive way can be found to improve the efficiency of this operation, tremendous savings will result. During the past few years there has been a tremendous increase in the movement of grain by motortruck, and attention is being given to finding ways of improving the loading and unloading of these vehicles at grain elevators.

Besides this work of improving transportation equipment, several studies were conducted to find improved ways of loading, stowing, and bracing commodities in railroad cars in order to reduce the loss and damage to the products while they were being transported. In one of these studies a new and more efficient container was developed for lettuce and carrots. A series of experimental transcontinental shipping tests showed that the new container would deliver a greater quantity of salable lettuce with less bruising and waste than the old Los Angeles crate. Records on the movement of 6,440 cars of lettuce and carrots shipped in the new crate showed about 50 percent less breakage than that experienced with the old crate. If the smaller amount of breakage so far experienced continues for the remainder of the year, the savings from this source should be approximately $725,000 per year.

Attention was also given to the problem of reducing the loss and damage in the rail shipments of cantaloups. A total of 45 test shipments were made to test the advisability of loading cantaloup crates upright on their ends instead of lengthwise

on their sides in order that the shocks of the moving train might be taken by the thicker lumber on the ends instead of by the more fragile slats. These tests proved conclusively that the upright method of loading would produce substantial economies for the shippers, distributors, and transportation agencies. Shipments in which this new loading method was used suffered only one-third as much container breakage under the same shipping and handling conditions as those in which the conventional lengthwise loading method was used. On the basis of 1950 loss and damage claim payments, a two-thirds reduction in container breakage would bring savings of $450,000 per year. It was also found that it was possible to load 24 more crates of cantaloups in a car with the on-end method than by the lengthwise method which would make it possible to transport the same quantity of melons in 16 cars as was formerly shipped in 17, thus saving about 1,700 cars per year in the movement of this commodity and reducing the refrigeration cost by about $275,000 on a year's shipments. A third saving from the use of the on-end method of loading was found to be brought about by a reduction of 50 percent in the amount of bruising of the melons. The total potential savings from this change in method of loading cantaloups will amount to well over a million dollars per year. It is thought that the principle developed here will have wide application in the transportation of other commodities. By the end of the fiscal year, more than 2,000 cars of cantaloups had moved into market loaded in accordance with the recommended new methods, and representatives of railroads, shippers, and receivers were conducting an educational campaign to encourage a rapid change-over to this method of loading. Work is also being carried on to improve the loading and transporting of cauliflower, broccoli, and celery.

A study of the movement of 3,650 carloads of dressed beef revealed a very high degree of correlation between poor running gears of meat-type refrigerator cars and the amount of damage to the meat transported in them. This information concerning the amount of damage in relation to the mechanical condition of cars is being brought to the attention of the carlines involved in order that they may take the necessary steps to correct the mechanical defects.

Work has been started in an effort to develop large, collapsible, reusable containers for the transportation of consumer size packages of various perishables. These containers are really pallets with collapsible sides. They hold sufficient volume to make them adaptable to fork-lift truck handling. Several test shipments of oranges in 5-pound bags packed in these containers have been made by both truck and rail, and a comparison of the costs of loading, unloading, and transporting commodities in this manner with those of the usual method has been made. The earlier tests revealed the necessity for making certain changes in the equipment being used so that the project will be continued into the next shipping season.

STUDIES TO IMPROVE MARKET NEWS AND GRADING

Two of the oldest marketing programs conducted by the Department are those of providing market news information and inspection and grading services. During the long period of operation of these programs, many changes have taken place in the structure of the marketing system, marketing practices, methods of transportation, methods of communication, areas of production, and marketing channels. In order that the market news and grading programs may continue to give good service to this

changing marketing system, these programs must be changed. To improve these services, three lines of work were carried on during the year: (1) Improvement of the effectiveness of the wholesale market news service; (2) exploration of the possibility of developing useful retail market news; and (3) study of the adequacy of grades and standards for farm products.

The work in this field is carried on in cooperation with the Office of the Assistant Administrator for Marketing and the commodity branches in order that the research conducted may at all times be aimed at finding the answers to the more pressing problems and that full use may be made of the personnel engaged in rendering these services.

In the annual report of the Branch for last year, it was pointed out that a program for the development of a well-rounded wholesale market news service had been developed. During this year six features of this recommended program were adopted.

The study of the practicability of and the need for market news reporting for prices received by creameries has been completed, and a manuscript prepared describing its results. Comparisons of terminal market quotations with prices creameries received for the period of the study brought out the fact that terminal market quotations for certain grades of butter were usually substantially lower than the average prices creameries were receiving; that usually there was little price distinction between grades A and B in local sales of creameries; that the average price difference between the print butter and that of the parchment wrap was less than the cost of placing the butter in cartons; and that the differences in prices among creameries for the same grade and package sold locally were wide--in some cases being as much as 6 cents. The experimental butter report developed under this study was sent to 618 creamery managers, owners, and directors, and a check was made on the uses which they made of it. Ninety percent of the creamery managers and owners and 58 percent of the directors reported that they used the information mainly in bargaining to secure more favorable wholesale prices, in assuring themselves that their prices were satisfactory, and in setting up local prices.

Because of the differences in trade practices in the various markets and the way that the market news service has developed over the years, numerous differences in reporting have arisen. Yet it is very important to shippers and producers that comparable information be made available from the various markets. In order to aid in bringing about more uniformity in reporting, studies of existing market reports issued in different cities were made to ascertain what differences existed among the data reported for the various markets. The information so tabulated has been made available to those people who are operating market news services so that they may take corrective action.

The market news service has long depended heavily on newspapers to carry the market information to producers and members of the trade, but a thoroughly adequate appraisal of the dissemination of market news by the daily papers has never been made. During the year, a survey was made of all the English language daily newspapers in the United States, and copies of 1,600 out of the approximately 1,800 daily papers were received. The kind of market news information carried in them

has been tabulated. The material was being analyzed at the end of the year, and a report will be prepared in the near future.

Under contract with the Iowa State College a study was completed measuring the effectiveness of radio, newspaper, and mimeographed reports in getting market news information to Iowa farmers. Three manuscripts have been written under this contract--one dealing with radio, another with newspaper market news dissemination, and the third an over-all report entitled, *How Do Iowa Farmers Obtain and Use Market News.* These manuscripts will be published during the coming year and will be of considerable assistance in improving the dissemination of market information collected by the Department, as well as indicating what changes in market information farmers would like to have.

In cooperation with the University of Arkansas, an effort is being made to determine the practicability of reporting local feed market news. Methods have never been developed to permit the reporting of local feed price information needed by poultrymen, dairymen, and livestock feeders. In this project special attention will be given to reporting the relative value of feeds in terms of current prices, the current prices of feeds in the local areas, and information on current and prospective supply situations.

For years proposals have been made that the Department report retail market news as a part of its regular market news service, but little has been known as to the practicability of establishing a retail market news service, what it would cost, and what good it would do. During the year an experimental retail market news project in Baltimore was completed, and a preliminary draft of a report setting forth the results of this study was written. This study showed that it was possible to get weighted average retail prices of more than 100 food items in Baltimore stores by collecting them weekly from only about 50 well-chosen stores, and that such a service can be operated at a very low cost. The study also revealed that to obtain reasonably reliable data on the volume of retail sales in the city would be impracticable because data would have to be obtained from a much larger number of stores. But it was found that reporting of volume on a regional or national basis would be practical. After the various users of the Baltimore retail market news report had received the reports for several weeks, they were contacted to find out what use, if any, they made of the information contained in them. About 80 percent of the housewives stated that they found the reports of use to them by helping them: (1) To substitute planned buying for impulse buying, (2) to judge better whether the individual items offered them in the stores were good buys, and (3) to check grocers' prices in order to select stores from which to purchase food.

Of the retailers who received the report, 75 percent stated that they used it to keep up to date with retail price changes, to keep in touch with the competitive price situation, and to keep their prices in line with others. The reports were used by 94 percent of the fresh fruit and vegetable wholesalers contacted; 60 percent of the meat slaughterers and processors; 46 percent of the fruit and vegetable canners; 57 percent of the frozen food processors and distributors; 29 percent of the dairy, poultry and egg wholesalers; and 22 percent of the canned goods wholesalers. Farmers receiving the report made very little use of it. Their chief interest seemed to be in comparing wholesale and retail price changes.

In reporting the prices in Baltimore it was found that with practically no additional expense reliable information could be obtained on the proportion of stores in the city carrying individual food items. Surprising variations showed up in the week-to-week coverage of many items by retail stores. The variations in the percentage of the stores carrying a given commodity may be illustrated by the fact that for the period May through October 1950 the percentage of stores carrying California oranges varied from 23 percent to 77 percent. Information on the proportion of stores stocking individual items is valuable to those groups that are interested in merchandising particular commodities.

Three studies were made of the adequacy of the Department's grading and inspection program. One of these measured the extent of use of the grading and inspection services for fresh fruits and vegetables by commodities and States and the trend in the use of these services since the programs began. Another measured the relationship between quality as measured in U.S. and commercial grades for poultry to market prices paid for this poultry. The third study in this field was a continuation of the review of the principles underlying the development of standards, with particular attention being given to an evaluation of the principles that have been followed in the development of standards in relation to the changes that have occurred in marketing methods.

REACTIONS OF ADVISORY COMMITTEES TO THE WORK

The work of the Branch and the progress made on its individual research studies were presented to most of the advisory committees that have been established under the Research and Marketing Act, and criticisms and suggestions from these committees were requested in order that the work being done may be channeled into those areas where the need is felt to be the greatest. After these committees reviewed the research work being carried on throughout the Department, they made their recommendations as to whether projects should be continued, expanded, or discontinued. Out of this series of advisory committee meetings came more than 50 recommendations for the continuation or expansion of projects being carried on in the Branch. The recommendations of these committees will be followed during the coming year in conducting the research program of the Branch so that the research may be as effective as possible in adapting the marketing system to current economic conditions. Attention will be focused on finding ways to distribute the large quantity of agricultural products that will be produced with a minimum expenditure of labor and other resources, with a minimum use of railroad and truck equipment, with the least possible damage to the products, and at the lowest possible cost. In areas where adequate market facilities do not exist, an attempt will be made to improve existing facilities or provide new ones with as little use as possible of critical materials. In short, the entire program of the Branch will be aimed at seeking ways to improve the efficiency of marketing.

On the pages which follow, the main activities of the Branch during the year are briefly described. It is hoped that this report will not only serve as a means of cataloging the activities of the year but that it will also be of considerable value in pointing up some of the problems in marketing on which additional research is needed and in bringing about greater coordination between the work being done by this Branch and other agencies working in the marketing field.

PLANNING MARKET FACILITIES IN SPECIFIC LOCALITIES

Concentration or assembly markets are markets where the products of the farm, ranch, or grove are concentrated in marketable volumes. They may be in rural areas or in cities. When such markets are located in a rural area, they are usually in an area of commercial production. In this case, the markets are sometimes referred to as shipping point markets, and practically all receipts are shipped out either by rail or by motortruck to more distant markets. When they are in cities, concentration markets may also provide a source of supply for local consumers, thus performing the functions of a terminal market. However, the majority of the receipts on city concentration markets are shipped out to more distant markets. City concentration markets may be either in areas of commercial production or along trunk rail and highway lines between the more important areas of commercial production and the relatively heavy consuming centers. Where the latter is the case, they are sometimes referred to as exchange or redistribution markets. In addition to providing facilities for assembling, displaying, selling, and loading out farm and food products, a relatively large number of concentration markets provide facilities, and in some cases equipment, for washing, grading, sizing, packing, and icing these commodities.

The largest quantities of food brought together in one place are in the Nation's terminal markets. The more important markets usually receive supplies from nearly all of the 48 States, and it is there that prices of farm and food products are established. That these markets function properly is therefore highly important. In many of these large markets facilities are not efficient, generally being antiquated and overcrowded. Frequently, instead of having a unified market where a complete line of products can be obtained, one type of commodity is handled in one part of the city, and another type is handled in another part. This leads to much cross hauling and other expense. Sometimes supplies arriving by one railroad are sold in one market district, supplies arriving by another railroad, in another district. Usually rail receipts cannot be delivered directly into wholesalers' warehouses because the railroads stop short of the market district, thus penalizing the railroads and adding unnecessary costs. Traffic congestion is commonplace. Many trucks bringing supplies to the market district or going there to haul them away cannot get near buildings for loading or unloading, and considerable porterage is necessary. Often the store buildings are not large enough to accommodate the commodities which should move through them, and they lack the refrigeration and facilities necessary to handle and protect the commodities properly. These are a few of the defects of the Nation's terminal markets which will have to be corrected before it can have a truly efficient marketing system.

Secondary or jobbing markets are the markets where the principal sources of receipts are nearby terminal markets. In this kind of market, receipts arriving directly from the areas of production are relatively small. Secondary markets may be either in the larger cities that have one or more terminal markets or in the smaller cities. Secondary markets in larger cities are usually patronized by buyers who prefer, because of the time required to visit the terminal markets and because of existing regulations thereon, not to patronize the latter kind of market. In the smaller cities where secondary markets are found, the volumes handled are usually

insufficient to warrant full carlot receipts. There are indications that secondary or jobbing markets may become less important in the marketing system for perishable commodities than they are today because of: (1) The continued expansion of motor-truck transportation of perishables which makes it feasible for dealers to receive less-than-carload lots directly from the areas of production and terminal markets and to distribute these commodities over a wider area than was previously possible; (2) the moving of terminal markets to more convenient locations and the improvement of facilities including provisions for streets of adequate width; (3) the growth of service-wholesaling and the consequent bypassing of secondary markets by such firms and chain stores; and (4) the impetus provided through competition for eliminating or minimizing handling costs such as cartage from terminal to secondary markets.

In a number of places the problem stems out of the fact that there are too many markets rather than from a complete absence of them. In these localities duplicating services and facilities increase marketing costs, scatter or fail to attract the buyer with a resultant lack of competition or demand, cause unnecessary travel on the part of farmers and buyers who go from market to market, and result in much waste of labor and deterioration of products. The benefits from the development of proper organization and facilities in the localities where markets are needed would accrue not only to farmers and consumers, but also to the trade which has a vital interest in better facilities, where it can operate more efficiently and where there are possibilities of expanding the volume handled.

One of the functions of the Branch is to develop plans and promote the construction of the proper kinds of market facilities for all kinds of farm and food products at all points in the marketing channel. Insofar as possible work in the specific localities is carried on in cooperation with some appropriate State agency, such as the State department of agriculture, the agricultural experiment station, or the extension service.

Projects tentatively completed in previous years have culminated in the construction of new market facilities at Augusta, Ga., Atlanta, Ga., Kansas City, Jackson, Miss., Greenville, S. C., and Trenton, N. J., and in the improvement of existing markets at Miami, Fla., Dallas, Tex., and Benton Harbor, Mich. Facilities are now under construction at Columbia, S. C., Hartford, Conn., San Antonio, Tex., and St. Louis, Mo. As additions may be made to these markets in future years or as problems may arise in connection with facilities or management, Branch personnel will attempt to provide the assistance requested looking toward the completion of projects in these localities.

In Baton Rouge, La., Little Rock, Ark., Savannah, Ga., Columbus, Ohio, Baltimore, Md., Milwaukee, Wis., and Houston, Tex., where studies have been made, market plans developed, and reports published during previous years, no further work was undertaken during the year. However, these projects are not considered as having been completed since Branch personnel expect to work with State or local groups at the appropriate time in promoting the construction of proper facilities.

Twenty-two projects were active during the year and the status of work at the end of the year in each of these localities is briefly described in the following sections.

WORK DONE DURING THE YEAR IN DEVELOPING MARKETS PREVIOUSLY RECOMMENDED

Boston, Mass.

Since the publication in June 1950 of the report on the market facility needs of Boston for handling all kinds of perishables and related products, the Commonwealth of Massachusetts created a State Market Authority and appropriated $100,000 to begin work on the project. Members of the Board of the Authority have been appointed, and an engineering firm selected to draw up the plans and specifications for the facilities that would need to be built initially on the site which was recommended in the report. In drawing up these plans the engineers are conferring regularly with the Branch so that the plans that are developed will be based on the combined judgment of the Branch and the engineering firm. These plans will be completed within a few weeks.

Cleveland, Ohio

The final report of a study made in 1947 to determine the need for a new retail market in Cleveland was issued in April 1951. The report, containing 35 pages, pointed out that revenue from market operations would not be sufficient to liquidate the cost of constructing and operating a new market building. As far as can be learned, the city of Cleveland has no definite plans to build a new market even though the old Central Market building was destroyed by fire in December 1949. Many of its former occupants are carrying on their business on the ground floor of a cold storage warehouse in the vicinity of the Central Market site.

Columbia, S. C.

In line with the plans developed by the Branch, as outlined in its report of January 1949, the South Carolina State Marketing Commission currently has under construction, on a 50-acre site near the Fair Grounds in the southern section of the Columbia metropolitan area, a modern wholesale produce market facility. Included in the original construction program are: Four store buildings containing a total of 61 units, 36 of which will have direct rail connections, for produce wholesalers; three sheds containing a total of 125 stalls for farmers and truckers; an office building; service station; container storage shed; paved streets and parking areas; and team tracks. Space will be available in the market area for a 100 percent expansion of the amount of facilities now under construction. The estimated cost of the new market, including the costs of land and construction, will approximate 1 million dollars. It is expected that some of the new facilities will be completed and occupied in August 1951. However, some of the construction work now under way may not be completed until October 1951. Branch representatives have continued to work with the State Marketing Commission as problems have arisen in connection with the construction program.

Dallas, Tex.

The market at Dallas was expanded during the past year by the completion of a 12-unit store building for produce dealers and a small administration building.

The buildings previously built include 2 farmers and truckers' sheds and a store building containing 16 units. Plans are under way to develop the remaining 16 acres in the site as the need arises.

Hartford, Conn.

In November 1950 a contract was let for the construction of wholesale market facilities at Hartford. Initial construction, now under way and scheduled to be completed in the fall of 1951, will include 52 store units with rail connections, sheds for farmers, and facilities for a farmers' auction. This development is taking place on what is known as the South Meadows site, a tract containing nearly 50 acres, near the Brainard Airport and the plant of the Hartford Power and Light Company. It is accessible to State highway No. 5. Plans call for the construction of 11 additional store units in the near future. The estimated cost of the entire project is $1,700,000.

Huntington, W. Va.

A detailed survey looking toward the improvement of the wholesale produce market at Huntington was undertaken early in 1950 in cooperation with the Department of Agricultural Economics, West Virginia University, at the request of the Chamber of Commerce, city officials, trade groups, and farmers. A report on the findings was published in November 1950. The Chamber of Commerce and officials of the city have under consideration the problem of undertaking the market development. The City Council has enacted an ordinance creating a market board, which is currently exploring the feasibility of the city's undertaking the market project.

Indianapolis, Ind.

Engineering plans for a wholesale produce market at Indianapolis were completed and a contractor selected for the construction of the market. The trade groups are raising additional funds for the development. With the value of the site they already own, they believe that they will need to borrow not more than half the total cost of the market. The corporation created to develop the market is negotiating with a large life insurance company for a loan for the remainder of the money, and plans are to begin construction as quickly as the financing arrangements can be completed. Members of the Branch are collaborating with the local groups in working out the plans for the market development, which will include in the initial development wholesale stores for handling about 75 percent of the business, a banana ripening and tomato repacking facility, and facilities for all kinds of frozen and processed foods. The total cost of the development will be about $2,000,000. The market will be developed on a 65-acre site between Twenty-First and Twenty-Fifth Streets just off Massachusetts Avenue, within a few blocks of the population center

Louisville, Ky.

The final report covering the findings of the study of the produce market in Louisville and containing plans for a new wholesale market, which was prepared in cooperation with the Department of Markets and Rural Finance of the University of

Kentucky, was published as Kentucky Agricultural Experiment Station Circular No. 69 in October 1950. The market recommended consists of 42 wholesale stores with rail connections alongside the rear platforms and 150 stalls under sheds for farmers and truckers. Total market cost was estimated at $1,070,000. Of this amount, the cost of land was estimated at $120,000 and the cost of constructing facilities at $950,000. The annual savings in marketing costs in the new facility were estimated at $321,000. The plans and recommendations have been presented to farmer groups, wholesale dealers, railroad officials, and to members of the independent retail grocer association. The Louisville Chamber of Commerce, the organization which requested the study, has appointed a special market committee consisting of wholesalers, farmers, and interested businessmen to sponsor the project and to devise ways and means of financing it. In November 1950, the market committee met with the Mayor of Louisville and the City Board of Aldermen to present a summary of the conclusions and recommendations of the Louisville report and to discuss possible methods of financing a new wholesale produce market. The consensus of this group was that the project should be sponsored and financed by the city of Louisville, and it was requested that the market committee prepare and submit a specific proposal for financing the market. Branch personnel have acted as technical advisers to this committee.

New Haven, Conn.

A detailed survey of the wholesale produce market of New Haven was completed and published in December 1946. A supplement to this report was issued in July 1950, which evaluated a new site (made available by filling one side of New Haven Harbor) as a possible location for a wholesale produce market development; to bring up-to-date information contained in the original report on cost of construction, amount of revenue needed to make the market self-liquidating, and sources of revenue; and to discuss the possibilities of building, financing, and managing the market through a private nonprofit corporation. Several meetings have been held to consider these recommendations.

As a result of the July 1950 report, the State Highway Commission of Connecticut, the sole owner of the proposed site, was asked to hold for a period of time about 40 acres of the site until the local groups and the State Market Authority could work out the problems with respect to developing this site. Since the Market Authority is engaged in building a new market at Hartford, it currently does not have funds available for one in New Haven.

The New Haven Planning Commission is considering the development of a slum clearance project in the area occupied by the present wholesale market.

Norfolk, Va.

Since the publication in June 1950 of the report on the market study in Norfolk, the local trade and farm interests formed a nonprofit private corporation. A grain storage facility was built which has a capacity of 650,000 bushels, a drier capacity of 600 bushels per hour, and some feed grinding and mixing equipment. Also, auction facilities for selling strawberries and for assembling farm produce are being planned, together with warehouse space for the handlers of produce and related products.

Raleigh, N. C.

A study of the Raleigh produce market was completed in fiscal year 1950. Since the publication of the final report, Branch personnel have worked with the State Department of Agriculture and the agricultural committee of the Chamber of Commerce in an effort to find means of financing the acquisition of land and the construction of facilities.

Richmond, Va.

Although difficulties were encountered in the acquisition of the site recommended for a market at Richmond and in financing the development, it appears that construction work will begin in the near future. Local groups have employed the architectural engineers to draw up the plans and specifications for the facilities needed. These engineers have been working with Branch representatives in determining the amount of facilities needed and the best layout to fit the particular site on which it is proposed to build the market. The drawings of the engineers have been completed and submitted to the Market Authority.

San Antonio, Tex.

Construction work on a new wholesale produce market facility in San Antonio began in October 1950 in line with plans developed by the Branch as outlined in its 45-page report published in June 1951. The original construction includes the following kinds and amounts of facilities: Two store buildings containing a total of 85 units for produce dealers, 150 stalls under sheds for farmers and truckers, 25 stalls under sheds for buyers, an office building, service station, paved streets and parking areas, and team tracks. The store buildings will be served by railroad tracks alongside the rear platform. Only 5 of the 85 units will have basements. The remainder will be single story units. The new facilities are being constructed on a 35-acre site at Laredo Street and South Zarzamora Street. Total cost of land and facilities will approximate $2,500,000. The new market is being financed by a private builder and contractor who has leased the facility to a nonprofit corporation, the stockholders of which are the wholesale produce dealers, farmers, and truckers who will sell or otherwise operate on the market. It is expected that the new facilities will be completed and occupied in September 1951.

St. Louis, Mo.

Construction work on facilities to accommodate wholesale fruit and vegetable dealers in St. Louis has progressed slowly because of the difficulty in bringing about the removal of railroad trackage in certain parts of the market site. These areas are now cleared, and present plans call for the completion of the facilities as rapidly as possible. The original construction will include about 100 store units, in two buildings, and team track yards.

Tulsa, Okla.

Local groups in Tulsa are still attempting to acquire the Trenton Avenue Market property for the development of a modern wholesale produce market, in line with the

recommendations made in the report published in March 1950. However, litigation over an estate of which the market property is a part has delayed action by groups interested in market improvements. In an effort to find ways of expediting needed improvements, a Branch representative met with the produce market committee of the Chamber of Commerce during the year to explore further with that group the feasibility of constructing a new market at a new location. It was found that conditions leading to previous conclusions with respect to the necessity for developing the Trenton Avenue Market as a central modern market remain unchanged.

Tyler-Jacksonville, Tex.

Since the publication of the final project report in June 1950, Branch representatives have worked with local groups in Tyler and in Jacksonville in further exploring types of ownership and methods of financing the proposed markets. At both localities it was decided by these groups that municipal ownership and operation would be most desirable, and the respective city administrations were petitioned to hold referenda to decide whether bonds should be issued to acquire land and construct the proposed facilities. Referenda were held in Tyler in January 1951 and in Jacksonville in March 1951. The market proposals were defeated in both instances. In Tyler, a second referendum is scheduled for August 1951.

NEW STUDIES CONDUCTED DURING THE YEAR TO DEVELOP MARKET FACILITIES

Asheville, N. C.

At the request of the North Carolina Department of Agriculture, the City Council of Asheville, the commissioners of Buncombe County, and the Asheville Agricultural Development Council, a study of the wholesale produce market at Asheville was undertaken in September 1950 in cooperation with the North Carolina Department of Agriculture. The conclusions and recommendations drawn from the study were presented orally to these groups in May 1951, and the final report, containing 35 pages, is in the process of being duplicated.

The need for improved facilities is primarily that of correcting the present unsatisfactory conditions in the Lexington Avenue Market, which is too small to take care of the business transacted there. Since there is insufficient area in the vicinity of the market for needed expansion, the only satisfactory way to solve the problem is to relocate these wholesale market facilities on another site. A market of sufficient size to take care of the needs of the wholesale handlers who would move to it would cost about $171,000. To make it self-supporting, an annual income of $25,000 would be required. But, to raise this amount, users of the market would have to pay higher rentals than they are now paying. Since it was impossible to show sufficient savings to offset the increased rentals, and since the new market would handle less than half of the wholesale produce business in Asheville, this development would be a risky venture and should not be undertaken unless it can be shown that the revenue would support it.

A few minor changes could be made to improve the situation in the present market. Several retail stands could be moved to vacant stores across the street to make available more parking space for wholesale sellers, and a revision of traffic regulations in and around the market would be helpful in relieving traffic congestion.

Beckley, W. Va.

In February 1951 a survey to determine the feasibility of the establishment of a centralized wholesale produce market at Beckley was undertaken at the request of the Beckley Chamber of Commerce. This study was made in cooperation with the Department of Agricultural Economics, West Virginia University. The field work has been completed, and the final report is being prepared for publication.

With the exception of a branch store of a wholesale fruit and vegetable firm in Charleston, W. Va., two dry grocery firms handling small quantities of fruits and vegetables, and one packer branch house, all firms supplying produce at wholesale to the area are located in larger marketing centers 15 or more miles away. Wholesale buyers in the area are primarily those buying for independently owned and company owned retail stores.

The several wholesale distributors in the city did not show favorable interest toward the development of a central produce market. The area as a whole consumes a much greater amount of all kinds of produce than it produces, and it is being well served by the more distant markets. Under the circumstances that exist there, the investment in central wholesale marketing facilities would be attended by a very high degree of risk. Therefore it was recommended that no attempt be made to organize and build such a market.

Nashville, Tenn.

In 1949, the Tennessee State Legislature enacted legislation authorizing Davidson County to issue bonds in the aggregate amount of 1 million dollars for the purpose of acquiring land and constructing produce market facilities and establishing the Davidson County Farmers' Market Commission.

In response to a request by the Commission a study of the Nashville produce market was made during September and October 1950. The conclusions and recommendations were presented to and discussed with the Commission in January 1951. The final report, consisting of about 50 pages, will be released shortly. It was recommended that new market facilities constructed in Nashville be located in the present wholesale produce market area. The improvements proposed include the acquisition of approximately 16 acres of land located about 4 blocks from the present fruit and vegetable wholesale market center and the construction of a store building containing 8 units for fruit and vegetable dealers and 2 units for poultry and egg dealers, all units to have direct rail connections; 125 stalls for farmers and truckers; and an administration building. The total cost of the proposed market improvement program was estimated at $660,000. Of this amount, land, including improvements, amounted to $260,000, and the cost of constructing the facilities amounted to $400,000. Savings in an improved market were estimated at $40,000 annually. At its

April 1951 session, the Davidson County Quarterly Court authorized the sale of market improvement bonds in the amount of $500,000, and the Market Commission has now awarded a contract for the appraisal of the property recommended for market purposes. Contracts have also been made with local architects covering the preparation of detailed plans and specifications for the facilities to be constructed.

San Juan, P. R.

The final report covering the market facilities proposed for metropolitan San Juan was sent to the printers before the end of the fiscal year. The preliminary findings of the study were presented to the various interested groups on the Island in a series of eight meetings in December 1950. Subsequent to these meetings the Puerto Rico Legislature at its 1951 session appropriated $200,000 for the development of facilities during fiscal year 1952 and recommended a substantial appropriation for port developments, which are a prerequisite to carrying out the recommendations of the Branch.

In its report the Branch proposed the construction of three types of facilities: (1) A wholesale produce market; (2) a slaughtering and meat-processing plant; and (3) grain storage, feed-mixing, milling, and vegetable-oil-extracting facilities. The total cost of such facilities would approximate 9½ million dollars, and the savings that would accrue to operators in the wholesale produce market alone, excluding the shipping lines and farmers, would be more than $600,000. A substantial part of the savings would be passed back to farmers or on to consumers; therefore the benefits of the proposed facilities would be reflected largely in the economy of the Island.

In addition to the dollar savings that can be determined for the produce market, many other benefits would result from the facilities recommended. The proposed facilities would provide a dependable outlet for much of the food products that can be grown economically on the Island. The increased production, milling, slaughtering, canning, and other processing which would be made possible would afford opportunities for increased employment of Puerto Rican labor. The ability to store bulk grain in considerable quantities and process it for human and animal consumption would make possible savings in the cost of transportation. Many products which are now going to waste, such as hides, edible and inedible wastes from slaughter, coconut and pineapple wastes, cane pulp, and similar products, could be salvaged. These and many other benefits could be obtained without any subsidy from taxpayers.

It was suggested that the facilities be developed by the Puerto Rican Government through the use of a public benefit corporation and that this corporation lease the facilities under suitable terms to responsible and capable operators who would perform the functions of receiving, processing, and distributing the food.

Winston-Salem, N. C.

A study of the produce market at Winston-Salem was undertaken in February 1951 in cooperation with the Extension Service, North Carolina State College of Agriculture and Engineering. The findings and recommendations drawn from the study were

presented to the local groups in April, and the final report, consisting of 28 pages, was published in May 1951.

Most of the wholesale distribution problems of the Winston-Salem market are found in the City Market area, which consists of the City Market building, the farmers and truckers' lot, and nine privately owned wholesale stores. In this area is handled more than one-half of all fruits and vegetables and a large part of the business in poultry, eggs, meats, and meat products. This study therefore was directed towards the improvement of conditions in the City Market area.

It was suggested that the city use the first floor of a building, formerly a tobacco warehouse, across the street from the market as a selling place for farmers and truckers, where they would have nearly twice as much room as they now have. The cost of making the necessary changes in the warehouse was estimated to be $6,000, exclusive of any equipment for lighting and heating. The space vacated in the City Market could be used as a parking area for market buyers, thus relieving some of the traffic congestion in the market area. Another improvement that might be made to relieve traffic conditions would be to make the main market street a one-way street.

MISCELLANEOUS WORK ON MARKET FACILITIES

Arizona

A study covering quantity buying of foods for home freezer storage by families in Arizona was begun in 1949, and Part I of the over-all study of locker plants as handling facilities for frozen foods was published by the Branch in June 1950, under the title, *The Relation Between Locker Plants and Home Freezers in the Distribution of Frozen Foods in Arizona.* During the year, considerable work was done on Part II, which: (1) Deals with an evaluation of the economic and convenience aspects of quantity buying of foods for storage in home freezers and (2) describes and appraises the manner in which home freezer owners obtain food supplies for their freezer units. It is a joint study between the School of Home Economics, College of Agriculture, University of Arizona, and this Branch. Complete records were kept during 1950 by 78 home freezer owners in the Phoenix area and by 5 locker plants in Phoenix and Tucson. The University ran experiments in cooperation with 8 Tucson families and 4 "families" at the University's Home Management House.

A published report on this phase of the study should be available the latter part of 1951. Information contained in it should be helpful to many groups of people--homemakers, frozen food distributors, locker plant operators, meat distributors, appliance distributors, power companies, and others. It should be helpful to homemakers in determining the practicability of home freezers. Families who invest money in home freezers need guidance so that they can obtain maximum benefits from their investments. Appliance and food distributors, on the other hand, need information on how to develop their products and services so that consumers will derive satisfactory benefits.

In order for freezer owners to obtain maximum convenience and economy in utilizing home freezers they should have access to assorted supplies of foods for

stocking their units. Farmers who raise their own vegetables, fruits, and meat and use proper methods of processing, packaging, and freezing usually benefit considerably from their home freezers. Likewise, home freezer owners who obtain meats and commercial frozen foods from locker plants at near wholesale prices usually realize the convenience of having a variety of foods on hand and the economy of quantity buying. However, in recent years many urban families have purchased home freezer units and have found that unless special efforts are made to obtain food supplies, they realize very little in the way of convenience because of the lack of variety and quantity. Moreover, in many instances sources are not available for quantity buying of frozen foods and meat at near wholesale prices. In such instances owners find little or no economic advantage in owning a freezer unit.

This situation has been exploited to a certain extent in a number of metropolitan areas by wholesale meat houses that normally supply cuts to institutional concerns. These houses offer meat in wholesale quantities to home freezer owners, but the cuts may be poorly packaged, if they are packaged at all, and sold unfrozen. The result is not only dehydration of the meat due to inadequate moisture-vapor-proof wrapping paper, but a loss of meat juices during the time between cutting at the supply house and slow-freezing at home.

The preliminary findings of the study reveal several general facts about buying foods in quantity for home freezer storage. (1) In Phoenix and Tucson home freezer owners have several sources of supply for obtaining quantities of commercial frozen foods and meats at near wholesale prices. Locker plants and special home-freezer catering firms in the two areas are giving good service to home freezer owners. This probably accounts for the relatively large number of home freezers in or near these cities. (2) Because supplies in these two areas can be obtained in variety and at discounts for quantity buying, home freezer owners usually realize considerable convenience from their units. In many instances, they also gain some advantage in economy, part of which is due to a better utilization of meal left-overs. (3) Observations in other sections of the country, which were confirmed in Arizona, indicate that families should make sure adequate sources of food supplies are available in their locality before purchasing a home freezer. (4) In urban areas there are opportunities for retail, wholesale, and locker plant firms to supply products at "quantity prices" to home freezer owners. However, ventures into this field require a knowledge of handling frozen foods and necessitate a well thought-out merchandising and customer information program.

Caribbean Market Facilities

Early in 1950 the Branch was requested to make a study of and prepare a paper covering marketing and distribution problems in the Caribbean area for presentation to the Fourth Session of the West Indian Conference at Curacao, N. W. I., November 27 to December 8, 1950. A preliminary study of the problems in this area revealed that they were in a general way similar to those in Puerto Rico. Therefore, because of time limitations and because of the fact that no specific recommendations might be made for the area as a whole, a paper entitled *Technological Aspects of Planning Marketing Facilities in Puerto Rico,* was prepared and presented to the Conference.

The general conclusions of the Commission on Conference Recommendations were "to study foreign as well as Caribbean markets and the possibilities of expanding sales in them with the purpose of making specific recommendations for the organization of markets in the different territories and providing the necessary marketing facilities." The committee considering the marketing problems, of which a representative of the Branch was the only adviser, recommended: "(a) that, in and between each territory an efficient distribution system, which allows the shipping of farm produce to consumers in the main urban centers, is essential to the development of a sound and varied economy in the Caribbean; (b) that this important problem should be brought to the attention of Territorial Governments and that detailed market facilities and distribution surveys should be undertaken in order to facilitate the reorganization of markets; (c) that Mr. Otten's paper, *Technological Aspects of Planning Marketing Facilities in Puerto Rico*, stresses the main points which call for wide and immediate application; and (d) that the requirements of each territory differ, and that market surveys undertaken in each territory must take into account economic and social conditions in that territory."

The Caribbean Commission is publishing in its *Economic Review* the paper prepared by the Branch.

MARKETING FACILITY RESEARCH

The objectives of marketing facility research are to determine principles and develop standards or criteria with respect to: (1) The proper layouts and designs for various kinds of marketing and storage facilities, (2) the amount of facilities needed in relation to volumes handled, (3) their location so that they will serve most efficiently the groups who use them, (4) the most desirable types of ownership and methods of operating facilities, and (5) other factors that affect the successful operation of different kinds of facilities and the enterprises conducted in such facilities. The results of studies in this field are used extensively in planning market facilities in specific localities. They are also useful to groups and individuals whom the Branch cannot assist in planning facilities to meet their specific needs.

During the year work was inaugurated or continued on 12 studies in this field. A brief report covering the work done on each study and the status of the work at the end of the year follows.

POSSIBLE ARRANGEMENTS OF RAILROAD TRACKS AT STORES IN WHOLESALE PRODUCE MARKETS

In developing plans for wholesale produce markets in specific localities one of the most complex problems encountered concerns the arrangement of railroad tracks connecting with the stores or warehouses of dealers. The problem involves the development of an arrangement that will provide adequate track capacity for all receipts arriving by rail, including utilization of free time on cars, without unduly increasing rental rates on the facilities served and physical handling costs. On most markets, multiple-unit store buildings for dealers have proved most satisfactory since they provide for flexibility of operations and require lower rental rates than would be required for single-unit or separate buildings for each dealer. However, where a number of produce dealers, each of whom usually has different requirements with respect to track space, operate in the same building, the needs of dealers both individually and collectively must be considered.

To determine the comparative efficiency of various track arrangements a study was inaugurated by the Branch in 1949. During the course of the study, different arrangements which provide track capacity for one or more cars per store unit were evaluated in terms of: (1) The cost of land and facility and the consequent rental rates that would be necessary to amortize the investment, and (2) physical handling costs.

The final report, consisting of 35 pages plus illustrations, which provides a comparison of 11 different track arrangements, has been completed and will be available for distribution within a few weeks.

AMOUNT OF FLOOR SPACE NEEDED IN PRODUCE STORES TO HANDLE SPECIFIED VOLUMES OF COMMODITIES

In developing plans for produce market facilities in specific localities it is necessary to include information showing the size and number of store units that

should be built at the time of initial construction in order to provide adequate platform and floor space for handling efficiently the anticipated volume of farm and food products. The objective of a pilot study on space needs of wholesale produce dealers is to determine the factors that can be measured empirically in making space recommendations for store buildings in terminal, secondary, and concentration markets.

During the year work was continued on the needs of wholesale dealers in poultry and eggs. A 40-page report was prepared in preliminary form for use by market facility specialists in this Branch. This report is entitled, *An Analysis of Volumes Handled Floor Space Used, and Rentals Paid by 249 Independent Poultry and Egg Dealers in 16 Cities*. During a previous year a similar report was prepared on the fruit and vegetable phase of the work entitled, *Space Used for Fresh Fruit and Vegetable Stores on Four Modern Produce Markets*.

The importance of providing the correct amount of space is that it may greatly affect the success of a new market. For example, if a market is underbuilt, dealers who cannot be accommodated might establish stores away from the market, and a split market with all its difficulties might develop. If a market is overbuilt, it might result in higher rents than can be afforded by the dealers locating there. Little or no reliable data now exist upon which to base estimates of the needs for store space. Therefore, such estimates can be made only on the basis of the total space currently used by dealers, from which adjustments are made. Also taken into consideration is the fact that in an efficiently arranged facility a larger volume of merchandise can be handled within a given unit of floor space than can be handled in inefficiently arranged facilities of improper design.

CRITERIA FOR PLANNING A WHOLESALE FROZEN FOOD DISTRIBUTION PLANT

Because of the need by frozen food wholesalers for more efficient plants, the National Wholesale Frozen Food Distributors, Inc., requested a detailed study of the facilities for handling frozen foods, which was initiated in fiscal year 1950. In selecting a sample of plants for study, consideration was given to their geographic location, size of business, and methods of receiving and delivering merchandise. Some of the plants selected have private space for long-term storage, while others depend upon public storage. Wholesalers using various methods of selling and having various types of facilities for order-assembling, -holding, and -loading were also included in the study.

General wholesale operations were studied in 32 plants. From these, 12 representative plants were studied in detail as to the arrangement and layout of facilities and the handling methods used. From the findings and observations made, a preliminary report has been prepared entitled, *Planning a Wholesale Frozen Food Distribution Plant*. The report covers: (1) Selecting a suitable location, (2) selection and use of storage facilities, (3) methods and techniques of assembling orders, (4) examples of plant layouts, and (5) selection and use of handling equipment.

The final report on this study, which will be available in fiscal year 1952, should be helpful to those wholesalers who are considering remodeling an old plant, as well as to those who are planning new ones. It should also be helpful to chain store firms that deliver frozen foods to their individual stores from a central warehouse, since facility problems of such operations are similar to those encountered by regular wholesale firms.

A number of frozen food distributors who are planning the construction of new facilities or the revision of old plants have held their plans in abeyance pending completion of the study. Most wholesalers are aware that the wholesale operation serves as a focal point for increased distribution of food in the frozen form. They know that increased distribution is related to lower prices, and thus they are anxious to find ways of increasing their operating efficiency so that they can offer lower prices to retailers and at the same time provide better service to their customers.

FACTORS THAT AFFECT THE SUCCESS OF WHOLESALE MARKETS FOR FARM PRODUCTS

The first phase of a study undertaken to determine the factors that affect the success of wholesale markets for various types of farm and food products deals with shipping point markets for fruits and vegetables. As the interest in markets has grown over the years, many market facilities built in producing areas have failed. Others have succeeded. To minimize losses in capital expenditures and insure against comparatively lower returns to growers that result from having too many markets with too small a volume, this study was made to determine what conditions are necessary to make reasonably certain that a concentration market, if built, will succeed. Data developed through this study will provide criteria which the Branch can use in its work in determining where markets are needed and in planning facilities of the right kind and of the right amount in those places. It should also aid in preventing the waste of funds by various groups in building in producing areas facilities that are doomed to failure before they are constructed.

An analysis of the data and records obtained from approximately 100 markets located at various points throughout the United States has been completed. A preliminary draft of the report has been written, and the final report will be published in fiscal year 1952. This report includes a description of the functions performed by fruit and vegetable shipping point markets and the types of marketing agencies which use the facilities. Both auction markets and private sale markets have been included in the study. The auction method of sale was found to be the more widely used by shipping point markets and has some advantages over the private sale method.

This study shows that the development of shipping point markets came about primarily because of: (1) The need of concentration points for shipment and grading facilities, and (2) the need for local price-making mechanism. One of the facts brought to light through this study is that many of the successful shipping point fruit and vegetable markets were subsidized for periods of from one to five years before they became self-supporting enterprises. To be successful, a shipping point market needs to handle daily a minimum of 5 equivalent carloads, or about 2,500 packages. Of the markets considered to be highly successful, only one reported an

average of fewer than 50 growers selling daily. In general there appeared to be little, if any, relationship between number of growers selling daily and the success of the market, providing there were enough large and medium-sized growers using it to maintain a relatively large and dependable daily volume of sales. Under optimum conditions not more than 50 percent of the growers within a shipping point market area will use the market. If the market is operating successfully, it will generally have the support of not less than 10 percent of the growers within the production area.

Other facts which the report will show are: (1) The relatively large extent to which shipping point markets provide a cash market in the production areas in which they are located; (2) the tendency for truck shipments to move directly from these markets to consuming centers; (3) the tendency for many of these markets to specialize in only one or two commodities; and (4) the effect of several factors, such as location, management, and fees charged, on the success of the market.

FACTORS THAT GOVERN THE SUCCESS OF COUNTRY ELEVATORS

A report will be published in fiscal year 1952 on the findings of a study the objectives of which are to determine what location, construction, design, size, equipment, and method of operation are desirable for a country elevator, how much the facilities will cost, and how they can be financed. This study was begun during the latter part of 1949 in response to requests received from agricultural institutions; independent, line, and cooperative elevator organizations; railroad, industrial, and farmer groups.

The report, now in preliminary form, indicates that country elevator grain storage space, as found in Indiana, was primarily used for current grain handling operations and was not of appreciable significance in the general grain storage situation. Supplemental and sideline enterprises carried on by country elevators were major factors in determining financial success, with the grain marketing function being of minor importance.

TYPES OF OWNERSHIP AND METHODS OF FINANCING WHOLESALE PRODUCE MARKET FACILITIES

To meet the needs of State and local groups interested in selecting the proper type of ownership and investigating various methods of financing new or improved wholesale produce market facilities, work was undertaken in July 1950 on the preparation of a manual covering these subjects. A preliminary draft of this manual has been completed, and it is contemplated that the final report will be released before the end of fiscal year 1952.

In this manual are discussed some of the principles of desirable ownership of wholesale produce markets. Certain criteria of desirable ownership of this kind of market outlined in the report are:

(1) The facility should be operated on a nonprofit basis.

(2) Each major group who uses or operates on the market and the public should have a voice in its management.

(3) Ownership should have sufficient legal stature or authority and actual or prospective collateral to obtain adequate funds, at relatively low interest rates, to acquire land and construct the proper types and amounts of facilities needed.

(4) The interests of lessees occupying facilities during the period when the original investment is being amortized should be protected.

(5) Responsible new enterprisers should not be discouraged from entering the trade.

(6) Discrimination against any produce because of its State of origin, any method of transportation, or any type of buyers and sellers should not be permitted.

(7) The public's interest should be protected from the viewpoint of duplication of facilities, health and sanitary standards, traffic controls, and the creation of an atmosphere conducive to the observance of proper trading practices or regulations.

In light of the foregoing considerations, the report appraises five different types of ownership: Public benefit corporation, private corporation, State ownership, municipal ownership, and farmers' cooperative association. Possible sources of funds for financing a market facility are discussed as well as the different types of collateral usually required of different types of borrowers.

OPERATIONAL EFFICIENCY OF FACILITIES AND HANDLING METHODS IN THE ASSEMBLY OF POULTRY AND EGGS

The rapid expansion of the poultry and egg industry in recent years has resulted in the use of facilities and equipment which are not suitable to present-day handling methods. Preliminary examination of poultry and egg assembly plants indicates a definite need for the development of facilities and handling methods which will improve processing and handling efficiency. Recent research on the quality of eggs at assembly plants has shown that the many handlings and inadequate facilities result in costly deterioration of egg quality. Secondary data show that inadequate assembly facilities are commonly found in many producing areas. In view of the rather widespread existence of inadequate assembly facilities the Branch has initiated a project to study the comparative operational efficiency of marketing facilities and physical handling methods for poultry and egg products.

The specific objectives of the work currently under way are to determine the different types of marketing facilities at assembly points; to inventory, categorize, and evaluate the different types of materials-handling equipment; to determine the space requirements for different volumes of products handled; to develop the principles involved and develop improved layouts and designs for different types and sizes of poultry and egg assembly facilities; and to determine on an over-all plant basis the comparative efficiency of different materials-handling systems and methods which will provide a basis for selecting plants for case studies of materials-handling equipment and methods.

To obtain the necessary information studies under variable conditions with respect to facilities are required on plant layouts, flow process charts, materials-handling equipment, different crew sizes and arrangements, and different methods of using equipment. The first phase of the work will cover a number of egg assembly plants of varying sizes in several producing areas. These will be selected so as to represent some of the more progressive assembly plants in operation, from which improved layouts and designs can be developed. The next phase will require the further selection and case study of outstanding plants from the standpoint of operational efficiency in the various size groups. The results of each phase of the work will be published to permit the plant operators to adopt the plant layouts, equipment arrangements, and handling methods best suited to their individual requirements.

CRITERIA FOR PLANNING PRODUCE AND GROCERY WAREHOUSES

To develop criteria for use in planning produce and grocery warehouses, personnel of the Branch have assisted the management of two firms in designing efficient warehouse buildings. Plans for facilities in two cities were submitted to the Branch for review and for advice before beginning construction.

TOMATO REPACKING FACILITY

A study of a design of a tomato repacking facility to fit into a terminal market layout was undertaken during the year, and a report will be issued in the coming year to aid tomato repackers in fitting their needed facilities into market structures designed for specific locations. The design will show placement of machinery and equipment and the flow of tomatoes through the plant, including the arrangement of degreening and sales rooms. There have been many requests by trade people for this information in locations where new markets have been recommended.

BANANA REPACKING FACILITY

A study of a design of a banana ripening, grading, and repacking facility as a part of a wholesale produce unit to be incorporated into the design of market facilities in specific locations was undertaken during the year. A report will be issued soon showing the arrangement of machinery and equipment in relation to storage and ripening rooms, including the flow of bananas through the respective facilities. The report can be used as a guide in setting up banana ripening and repacking facilities within old or new structures in central produce markets.

STANDARD TERMINOLOGY FOR HANDLERS OF POULTRY AND EGGS

A review of secondary data concerned with the assembly and marketing of shell eggs showed that different investigators and research workers vary considerably in their terminology for the description of handlers of poultry products. In many instances it is not possible to compare directly the results of various studies because of the lack of uniformity in terminology. Furthermore, many workers fail to define their terms, which in some instances have a variety of meanings, depending upon the particular producing area or region of the country.

A committee, consisting of members of this Branch and of other Department agencies, was created to study terminology and develop terms descriptive of the handlers of eggs and poultry at assembly points. During the course of the committee work it was determined that a similar standard terminology should be developed for city distributors of poultry products. The preliminary report entitled, *Proposed Standard Terminology for Handlers of Poultry and Eggs* was assembled and distributed to the committee for revision. After several revisions a final draft was prepared and submitted to the Poultry Economics Subcommittee. This committee has deemed it advisable to sponsor the publication of this report in modified form after it has been submitted to interested persons and research workers throughout the country. It is quite probable that the report will be completed and published during the next fiscal year.

METHODOLOGY OF MAKING MARKET FACILITY SURVEYS

Based upon experience gained during the past years in conducting market facility studies in specific locations, a report is being prepared outlining the fundamental problems to be considered. The report will cover the problems of facility location, size, and design; streets required; railroad, truck, boat, and air transportation; problems of management; as well as many other factors. The report should be published in the coming year. There has been a great demand for such a publication by educational institutions; State, county, and city planning boards; commissions; and associations; as well as highway departments and many others.

MATERIALS-HANDLING RESEARCH

Materials-handling research is the counterpart in the marketing field of mechanization research in the production field. Both types of research have the same general objectives--to increase the productivity of labor and thus reduce the amount of labor required for performing specific operations. In light of the need for conserving manpower during the period of defense mobilization, the emphasis in the foregoing objective might be changed to handling larger volumes of farm and food products with the same labor used in 1950.

The three projects underway during the past year covered research on materials-handling operations in: (1) The stores and warehouses of wholesale fruit and vegetable distributors, (2) commercial apple packing and storage houses, and (3) cotton warehouses. Work on the first and third of these projects was inaugurated during previous years and is being conducted with Branch personnel. The second was inaugurated in October 1950 under a contract with the Washington State Apple Commission.

STORES AND WAREHOUSES OF WHOLESALE FRUIT AND VEGETABLE DISTRIBUTORS

Case studies of materials-handling operations were conducted in four additional warehouses during the year ended June 30,1951, which brings to a total of seven the number of warehouses in which such studies have been made since the adoption of this research method. Although the emphasis is placed on obtaining comparative cost data with respect to specific materials-handling operations performed with different methods, including different types of equipment, which will be useful to the industry as a whole, a report to management is made on each individual plant in which studies are made. In these reports, materials-handling costs are computed from data on labor requirements obtained through time studies of both old and revised operations and from data on equipment costs. In the selection of warehouses for case studies primary consideration is given to significant variables on which data are needed such as: (1) Size and layout of warehouses, (2) types of materials-handling equipment used, and (3) warehousing operations affecting handling costs.

In one of the four warehouses in which case studies were made, an experiment was also conducted on the use of recording and transcribing equipment for use in loading-out delivery trucks. Studies of loading-out operations in the warehouses of service wholesalers of fruits and vegetables showed that, with a conveyor system, a three-man crew is normally used to load out the trucks after the merchandise has been assembled. One of these crew members is a checker who calls off, in proper sequence, from a recapitulation sheet each item to be loaded. In the experiment, orders were recorded, in the proper sequence for loading, on a memobelt by a clerk in the office while performing his usual duties. This recording was played back in the warehouse over transcribers with proper audio and control equipment. In the warehouse where the experiment was conducted, a two-man crew using the recording and transcribing equipment maintained the same or a higher rate of production than had been maintained by the three-man crew in which one member served as a checker. A report of the experiment will be released within a few weeks.

Other reports on which work was done but which had not been completed at the end of the year include: (1) The comparative efficiency of different types of equipment for unloading and placing bananas in storage; (2) the comparative efficiency of different types and combinations of types of equipment for loading-out operations in the warehouses of service wholesalers; (3) the possibilities of joint or cooperative ownership of modern equipment by small dealers on wholesale markets; and (4) an appraisal of several currently used methods for cutting, weighing, and packing bananas for wholesale distribution.

COMMERCIAL APPLE PACKING AND STORAGE HOUSES

Inaugurated by the Washington State Apple Commission in October 1950 under a research contract, the work covers case studies of materials-handling operations in 15 plants. Data are being obtained through time studies of labor requirements for handling four types of packages of apples with 10 different types or combinations of types of materials-handling equipment. Other variable conditions affecting handling costs are also being studied.

Although it is not expected that the project will be completed and a final report issued until October 1952, four reports covering improved methods for performing specified operations have been prepared and will be published in advance of the 1951 harvesting season. Other brief reports will be prepared for release as the findings warrant as a means of making the results available to the industry in advance of the completion of the project.

COTTON WAREHOUSES

The study of materials-handling in cotton warehouses, on which field work was begun in the spring and summer of 1949, has as its primary objective the determination of the relative efficiency and economy of various materials-handling methods, including different types or combinations of types of equipment, that are used to perform the different warehouse handling operations.

The techniques used to analyze the many different handling operations observed and to assist in evaluating the effectiveness and relative efficiency of alternative handling methods include methods analysis, work simplification, time study, and modified forms of ratio-delay study. These are some of the basic tools of the industrial engineer.

Field work, in which project engineers observe the performance of cotton handling operations in many different kinds of cotton warehouse facilities with different types and combinations of materials-handling equipment being employed, was continued in connection with the warehousing of the 1950 cotton crop. During the past year, visits for this purpose were made to 55 different warehouses in 44 cities located in Alabama, Arizona, Arkansas, California, Georgia, Mississippi, Missouri, New Mexico, North Carolina, South Carolina, Tennessee, and Texas. A total of 232 time studies were made. These were directed primarily toward filling in gaps which remained in materials-handling information obtained from studies previously conducted.

In December 1950 a report entitled, *An Evaluation of the Use of the Portable Platform Dial Scale for Weighing Operations in Cotton Warehouses*, was issued. This was the third of a series of brief reports that are planned. In this report it was shown that in a typical warehouse situation, the use of a portable platform dial scale in place of a standard cotton beam scale results in saving the labor of 4 men--3 manual laborers and 1 clerk--out of an original weighing crew of 6. Under assumed wage rates of 75 cents an hour for manual labor and $1 an hour for clerical work, a saving in direct labor costs of at least $325 was possible for every 100 hours' use of the scale. A number of warehouses formerly using beam scales, and several which are equipped with one or more dormant floor scales, are now using portable platform scales either to replace or supplement their older weighing equipment.

The two reports issued last year dealt with improved methods for stacking cotton in "cordwood" fashion, and "feeding" bales to the dinky press, respectively. Since most of the 1950 crop moved into and out of warehouses at a rate which required relatively short periods of storage, it is difficult to determine to what extent warehouses normally employing the "cordwood" stacking arrangement have, or would have, made use of the improved stacking method recommended. However, it is known that within the past year a large number of cotton compressors have adopted the improved method for supplying bales to the dinky press, with substantial, and sometimes quite remarkable, savings in manpower.

Work was begun on three reports to be issued later in the calendar year 1951. One report will cover some improved methods for receiving cotton (unloading cars and trucks, weighing, sampling, and transporting to storage); a second report will deal with some ways by which warehousemen themselves may develop improved methods for handling cotton in their own plants; the third report will suggest a program for preventive maintenance as applied to materials-handling equipment used in cotton warehouses. The latter report is an outgrowth of a study which has been carried on with the assistance of a group of about 35 cooperating warehousemen, of operation, maintenance, and repair costs for various types of materials-handling equipment used in cotton warehouses. The original purpose of this study was, and is, to determine the equipment costs that must be added to labor costs in order to measure the relative economy of different types of handling equipment and methods that can be employed for a given operation. The cost data that have been assembled offer an excellent basis, however, for developing information which will be helpful in preserving the life and usefulness of materials-handling equipment.

PROCESSING PLANTS

In cooperation with Purdue University, a study has been conducted to find ways of reducing the cost of handling milk in receiving rooms of Indiana milk plants. In this study existing receiving arrangements were analyzed and new arrangements in work methods developed which provide greater operating efficiency. Twenty receiving rooms were studied, and the existing methods, together with the improved methods that were developed, were measured by time-and-motion studies. The improved arrangements were tested under actual operating conditions.

The report on this study will be published by Purdue University. Some of the important findings are as follows:

1. There was no significant relationship between the size of the plant and efficiency in the use of receiving-room labor. Some of the smaller plants were much more efficient than the larger ones.

2. More than 43 percent of the total time paid for in these plants was nonproductive, and the percentage of nonproductive time decreased as the size of the crew decreased. Similarly, the total time required for the receiving operations per can decreased significantly with decreases in the size of the crew.

3. The time requirements for sampling ranged from 0.0936 to 0.4338 minutes per producer, and the vacuum sampler appeared to have greater labor-saving potential in one- or two-man arrangements than did hand sampling.

4. Weights were recorded 12.5 percent faster with an automatic tape scale than by hand, but the total time, including posting the weights to permanent office records, for the automatic tape scale was 112.7 percent more than with manual recording.

5. Delay for equipment was excessive in some cases. In one case the operators were delayed 20 minutes out of each hour of operating time for the washer alone. Operators in some cases spent considerable time waiting for the milk to move from the unloading dock to the operating positions.

6. One man would be an adequate crew under usual conditions for a plant with a maximum daily volume of 75,000 pounds with either of the following arrangements:

a. Fully automatic arrangement with a vacuum sampler and an automatic tape scale.
b. Semi-automatic arrangement with automatic tape scale and manual sampling.
c. Semi-automatic arrangement with vacuum sampler and manual weight recording.

7. Two men would be adequate for a plant with a maximum daily volume of 150,000 pounds with either a fully automatic arrangement with a vacuum sampler and an automatic tape scale, or a semi-automatic arrangement with automatic tape scale and manual sampling.

8. The time required per hundredweight for handling milk decreased as the size of the producer increased.

9. Two different one-man arrangements were actually installed and operated successfully in a plant originally using three men, and the total labor saved by each of these improved arrangements was about one-third. Labor savings made by substituting a one-man unit for the original three-man unit would have been sufficient to amortize within 7 months the more costly change which involved the installation of a vacuum sampler.

MERCHANDISING, PACKAGING, AND RELATED MARKETING FUNCTIONS

The Branch conducts research on retailing, wholesaling, merchandising, packaging, and other subjects where the emphasis is primarily on the function rather than on the commodity, in order to increase efficiency, reduce costs, and improve quality and consumer acceptability.

Research conducted for the purpose of increasing the efficiency of marketing agencies often proves to be more productive than the type of research which concentrates on the problems of one or two commodities. For example, many agricultural commodities have common packaging problems; still larger groups have common problems at the wholesale level; and practically all of them have some common problems at the retail level. Improvement in the efficiency of some operating practices at the retail level may reduce the cost of distribution on all of the 3,500 items stocked by a good size supermarket. A reduced cost of distribution, irrespective of the level, usually results in the long run, in the producer and consumer sharing the benefits with the distributive trade.

Although research in the general field of food retailing and grocery wholesaling has been underway in the U. S. Department of Agriculture for only about two years, considerable progress has been made in obtaining industry cooperation. An industry advisory committee, composed of leaders in the food distribution field, has made recommendations for research to be conducted in some of the most urgent areas. All the projects described below are being carried on in response to these recommendations. Many individual retail and wholesale organizations, as well as three national trade organizations, are actively cooperating on research projects.

Business conditions resulting from the national emergency caused an increase in food prices and in physical volume sold. Most costs, especially labor, increased. These developments shifted the need for research from expanding the markets for farm products to improving the efficiency of distribution by increasing the productivity of labor and maximizing the use of capital, equipment, and facilities. Research conducted by this Branch in such general functional areas as retailing, wholesaling, packaging, and merchandising has been redirected to help answer some of the current problems caused by the emergency situation.

REDUCING THE COST OF HANDLING PRODUCTS IN RETAIL FOOD STORES

Research on reducing food handling costs in retail stores during the year has dealt with three operations: (1) Checking out; (2) receiving, price-marking, and stocking shelves; and (3) self-service selling of meats, poultry, and cheese. These operations were studied in self-service food stores with various volumes and location conditions in several major cities. Time studies were made of typical operating procedures, after which improvements were developed and tested.

Check-out Operation

The study of the check-out operation in self-service retail food stores has been completed, and a report, *The Check-out Operation in Self-Service Retail Food Stores*, was issued in January 1951. The results of this study, which were reported in the annual report covering the activities of the Branch for the past year, have been widely publicized by the retail trade. The check-out counter developed, for which a patent was applied for and dedicated to public use, has been installed in more than 1,000 stores. One national chain organization has adopted it as standard equipment, while others are experimenting with it. Hundreds of local chains and independents have requested plans and details of the results, and a number of them have already installed the counters.

Receiving, Price-Marking, and Stocking Operation

A considerable portion of the work during the year has been devoted to the analysis of data collected on receiving, price-marking, and stocking grocery items. The study showed a potential increase of from 60 to 85 percent in productivity per man-hour when recommended operations were adopted.

Receiving.--Although the receiving of merchandise took a rather small part of the total time needed to perform all three of the functions under study, substantial efficiencies were found to be possible. Receiving crews of varying sizes in seven stores were timed as they received merchandise in their usual manner. Next, facilities and arrangements in these stores were changed and performances under these new operations were compared with performances under the typical operations. The results are shown in table 1.

Table 1.--Comparison of productivity per man-hour by use of recommended practices and typical practices, in 7 self-service food stores

Store	Typical operations		Improved operations	
	Size of crew	Prod. per man-hour	Size of crew	Prod. per man-hour
	Number	Cases	Number	Cases
1	5	93	1/ 2-1/3	277
2	2	227	2	337
3	2	142	2	314
4	3	135	1/ 2-1/3	372
5	5	73	4	207
6	5	74	4	207
7	2	105	2	335

1/ When the incoming motortruck was unloaded from its side door, two men worked in the truck and a third man worked on the floor beside it. When grocery items were stacked on both sides of the conveyor, one man worked in the truck and one man worked on each side of the conveyor. These uses of 3-man crews in some of the test work account for the statistical showing of a crew composed of 2-1/3 men in stores 1 and 4.

Increased production resulted from the application of two principles: (1) The wheel-type roller conveyor was substituted for the usual 2-wheel and 4-wheel trucks wherever possible. (2) The back room was laid out in such a way that groceries could be stacked according to commodity groups, for easy price-marking later, and the stacks were so located that the farthest point in the stack was within 10 feet of the conveyor.

Price-marking.--Price-marking required about one-third of the total time used to perform the three functions of receiving, price-marking, and stocking. Four methods of price-marking merchandise that are ordinarily used were analyzed, and improvements were introduced which resulted in increases of from 56 to 90 percent in number of cases price-marked per man-hour. These improvements consisted of: (1) Obtaining cases from segregated stacks of merchandise with the use of a roller conveyor; (2) using the individual price stamp set, a set of about 50 stamps containing the price figures most frequently used; (3) using a 1-for-3 or a 1-for-4 method of stamping, that is, striking the ink pad after every third or fourth unit stamped; and (4) placing the marked cartons (when price-marking occurs in the back room) on a 4-wheel truck, on which they are moved to the store shelves and from which these items are lifted directly onto the shelves.

Stocking.--The stocking of merchandise required more than half of all the time it took in the test stores to receive, price-mark, and stock goods onto the shelves. Usually, cartons of grocery items are moved from the back room to the shelves in the store proper in either a 2-wheel or a 4-wheel truck. The 4-wheel truck proved considerably more efficient because its use makes it possible to stock the shelves directly from the truck. When the 2-wheel truck is used, its load has to be deposited to the floor and then placed on the shelves.

In the typical method of stocking the shelves, the employee frequently lifts an item from the floor or the 4-wheel truck with one hand, passes it to his other hand, and with that second hand places the item on the shelf. When using this method, the average stocker handled 22.6 cartons per man-hour. But when he used his hands properly and moved the items directly from a 4-wheel truck to the shelf, he averaged 29.4 cartons per man-hour--an increase in output of 30 percent.

Through the proper use of a new leaf-type shelf, which was developed as part of the study, production was increased to 34.3 cartons per man-hour--an increase of 52 percent over the old method. The leaf-type shelf is built into each 3-foot length of the regular store shelf, and is for use during stocking in supporting cartons at a height of about 3 feet above the floor. It is conducive to proper stocking procedure and also saves the stocker the time and labor of stooping to pick up items from the truck or the floor. These leaf shelves also have been used as merchandising aids in moving advertised items during week-ends.

Service Type Meat Operation

Early in 1951 research was begun which has for its objective increasing labor productivity of service and self-service meat departments of retail stores through developing improved methods, equipment, materials, and layout. The labor problem in the meat department is one of the most acute problems in the average retail food store.

Several types of meat markets were selected to represent differences in market layouts, methods, equipment, volume, location, and type of management. The labor presently used in the meat department has been broken down, for each type of meat handled, into the major operations of receiving and weighing, breaking down into wholesale and retail cuts, weighing and wrapping, displaying of merchandise, and customer service. Performance for each market will then be related to the differences in characteristics and operating methods of the markets.

Increased man-hour production and maintenance or improvement of the quality of the product are being developed through work simplification and the application of the principles of time and motion study to each method of operation, type of equipment, and layout. The improvements are being installed in the cooperating markets and are tested under operating conditions. This work will continue during the 1952 fiscal year.

PREPACKAGING MEAT, POULTRY, AND OTHER ANIMAL PRODUCTS

Fresh meats and animal products are being prepackaged primarily to make them suitable for sale on a self-service basis. As of January 1, 1951, an estimated 2,800 food stores had complete self-service meat operations, while an additional estimated 8,000 had a partial operation. On January 1, 1949, only about 400 food stores in the United States had complete self-service meat departments.

Costs of and Reasons for Rewrapping Prepackaged Meat, Poultry, and Cheese

The study was undertaken to measure the amount and cost of rewrapping prepackaged meats, poultry, and cheese and to find the reasons why rewrapping was necessary. This study is one of a series designed to aid retail store operators in the handling of prepackaged foods.

Observations of the time required to rewrap previously packaged meat were made in three Washington, D. C., supermarkets with self-service meat departments. Reasons for rewrapping, as well as the cost of rewrapping, were obtained for 4 weeks in each of two supermarkets, and for 2 weeks in a third, during the period April 10 through June 24, 1950. This information was obtained for all of the various cuts of the 5 principal types of meat, as well as poultry and cheese.

During the test period 73,740 packages of meat, poultry, and cheese were wrapped, of which 28 percent was beef; 23 percent cold cuts; 19 percent pork; 11 percent poultry; 10 percent cheese; 5 percent veal; and 4 percent lamb. Of the quantity wrapped 5,738 packages, 8 percent, were rewrapped and 196 packages spoiled.

Results of the study show that an average of 7 to 11 percent of these products required rewrapping. An average of 8 percent of the packaged beef was rewrapped with such cuts as rib, rump and shoulder roasts, short ribs, and flank steak requiring the largest percentage of packages to be rewrapped. An average of 9 percent of the pork packages was rewrapped. Packaged kidneys, rib roasts, ham butts and shanks,

fresh picnics, and smoked knuckles required relatively the most rewrapping. Packaged lamb had 10 percent rewrapped. An average of 7 percent of the packaged veal required rewrapping, such cuts as leg, tongue, and sirloin roast requiring themost rewrapping. The average percentage of packaged poultry requiring rewrapping was 8 with a relatively small difference between the various cuts. An average of 7 percent of the prepackaged cold cuts was rewrapped. The cuts requiring the largest percentage of rewrapping were pimento, bologna, pepperoni, roast beef, and macaroni and cheese loaf. An average of 8 percent of all the packaged cheese was rewrapped. Of those varieties selling a large volume, New York Sharpe and unsliced Sweitzer caused the most trouble.

The reasons for removing the 5,934 packages of meat, poultry, and cheese from display fell into five categories. The necessity of making price changes required the removal from display and the rewrapping of 31 percent of the total and was especially common for cold cuts, cheese, and poultry. Discoloration, common for the red meat cuts and cheese, required the removal for trimming and rewrapping of 26 percent. Unattractive packaging due to poor trimming or wrapping by employees and to the leakage of meat juices accounted for 24 percent of the total removed from display. Broken film, resulting from customer handling, caused trouble in 16 percent of the packages and was an especially serious problem for large odd-shaped cuts of beef, pork, lamb, and veal. Spoilage caused 3 percent of the packages to be removed from display and was relatively the highest for lamb.

The average cost of rewrapping 5,738 packages of meat, poultry, and cheese was 2.70 cents per package. Rewrapping costs had a fairly narrow range from 1.36 cents for cheese to 3.44 cents for poultry. Labor costs averaged 58.8 percent of the wrapping cost; film costs averaged 21.5 percent; tray costs 10.6 percent; and backboard costs 9.1 percent. The average value of the 196 packages disposed of because of spoilage was 68.86 cents. These costs ranged from 0 for cheese to $1.64 per package for poultry. The cost of rewrapping amounted to an average of 0.25 percent and the loss by spoilage to 0.23 percent of the sales value of all meat, poultry, and cheese displayed.

The most effective way of reducing rewrapping is to maintain a high rate of turnover by ordering and wrapping meat in line with current requirements. Rewrapping, due to price changes, may be reduced by using outside labels, or changing the label by slitting the film. Discoloration is reduced when meats have gone through a blooming period, have a good turnover and are properly refrigerated. Fading is reduced when some technique is used to reduce the amount of light exposure. Unattractive packaging, as a cause for rewrapping, can be reduced by properly trimming and wrapping the meat; using trays for cuts such as liver, kidneys, and brains; and allowing free fluids to drain before packaging. Film breakage can be reduced by the selection of the proper film, use of proper sealing temperatures, and removal of sharp and excess bones.

Improved Efficiency in Prepackaging Meat

The other line of research which has received considerable attention in the field of prepackaging meat has for its general objective to assist retailers in

developing and adopting efficient methods of prepackaging meat in self-service food stores. This project is coordinated with one being conducted simultaneously in service type meat markets. As in the other project, several self-service meat markets were selected to represent differences in market layouts, methods, equipment, volume, location, and type of management. Attention has been focused on present methods of cutting, wrapping, weighing, price-marking, and servicing the cases.

Improved methods of performing the various packaging operations will be developed and tested in the selected meat markets. The economies of selling meat by the self-service method will be compared to the service type of operation. The work on the self-service meat markets will continue during the 1952 fiscal year.

IMPROVEMENT OF MERCHANDISING METHODS AND PRACTICES IN WHOLESALING AND RETAILING

After careful consideration of the many food merchandising problems the Food Merchandising Advisory Committee recommended that research be started on (1) areas of cooperation between wholesalers and retailers which, if made to function properly, will increase efficiency and lower costs for both groups; (2) efficient utilization of store selling space and equipment; (3) layout and design of retail food stores; and (4) development of more efficient and effective personnel hiring and training practices. As personnel becomes available, work is being started in these fields of research.

Sale of Orange Concentrate through Mechanical Dispensers

A study to determine the effects of the use of mechanical counter-type machines on sales volume and preservation of the natural qualities of orange concentrate was completed, and a report, *Merchandising Reconstituted Frozen Concentrated Orange Juice Through the Use of Mechanical Dispensers* was issued in March 1951. Three types of mechanical dispensers were tested in comparison with the conventional jug method of dispensing the juice in 12 drug store fountains in Richmond, Va., and Washington, D. C., for 6 months--December 1, 1949, to June 1, 1950.

The sales of orange juice in the test stores were about 18 percent greater when the juice was sold from the mechanical dispensers than when it was sold from the jugs. Small stores tended to have better sales results from dispensers than did the larger stores. Fountain managers in the cooperating stores agreed that the dispensers were more efficient than the jugs in serving reconstituted frozen concentrated orange juice. The operating efficiency of the machines resulted in improved service. It was reported that dispensers generally reduced losses due to wasted juice, especially from jug breakage. The "eye appeal" of the machines appeared to be important in promoting greater sales volume through impulse buying.

Mechanical dispensers of the types tested must be carefully handled and kept clean if proper conditions for maintaining the natural qualities of the product are to be achieved. Laboratory tests showed that in order to retard the growth of bacteria and loss of vitamin C content, the temperature of the juice in the

machines should be maintained at a point close to 38° F., and the juice should not be carried over longer than two days after reconstitution.

Relation of Methods of Retailing Citrus Fruits to Quantity of Sales

The Branch participated in a Southern Regional research project on the marketing of citrus fruits. As a result of this activity the Branch has issued two reports: *Consumer Buying Practices and Preferences for Purchasing Oranges by Weight or Count, in Selected Cities* and *Package and Bulk Selling of Florida Oranges*. The results of the first of these two studies were reported in the 1950 annual report.

Experiments in selected retail stores were conducted to determine consumer preference in buying oranges--whether they prefer to buy from bulk displays or in consumer-size bags, and if in bags, what size and what type. Experiments were conducted from March 20 through April 15, 1950, in 21 stores in Binghamton, Buffalo, and New York, N. Y., to obtain comparative sales data and opinions on purchasing oranges in bags (mesh or transparent) or in bulk. Other tests were made in 18 supermarkets in Newport News, Norfolk, and Richmond, Va., from May 1 to June 3, 1950, for the purpose of determining the preferred bag size.

The total quantity of Florida oranges sold in bags in the Binghamton test stores was about one and one-half times the quantity sold in bulk, but was only about one-half the combined sales of Florida and California bulk oranges. In the Buffalo stores, total bag sales were about equal to either Florida or the California bulk sales. Bag sales of Florida oranges for the New York City stores were nearly four times the sales of Florida bulk and almost twice the combined sales of Florida and California bulk oranges during the test period.

Customers who selected bulk oranges in preference to bagged oranges did so for three principal reasons: (1) They believed the quality or appearance was superior; (2) they desired to purchase a smaller quantity than the bags contained; and (3) they had found bad oranges in previous bag purchases. The predominant reason given by the bagged-orange purchasers for selecting oranges in this manner was the convenience of the bags.

Relative sales, during the test period, of Florida oranges in mesh and transparent bags were about the same in Binghamton. Sales in transparent bags substantially exceeded those in mesh bags in Buffalo, while in New York City the mesh bag sales exceeded transparent bags by more than 3 to 1. The most common reasons given by customers for preferring the mesh to the transparent bag were habit, better quality or appearance of the fruit, and stronger bag. The most common reasons given for preferring the transparent bag were better visibility and the value of the bag for re-use.

Total Florida orange sales amounted to 37,505 pounds during the test period in three cities in Virginia. Of this total, 34 percent were in 5-pound bags, 27 percent in 8-pound bags, 25 percent in 7-pound bags, and 14 percent in 4-pound bags. Over four-fifths of the customers expressed a preference for the 5- and 8-pound bags, which were the sizes available before this study was made.

Wholesale-Retail Cooperation in Food Distribution

Three lines of work are being carried on in the field of wholesale-retail cooperation in the distribution of food. The business of large wholesale grocers doing a major portion of their business with voluntary chains are being intensively studied in cooperation with the National-American Wholesale Grocers' Association for the purpose of discovering efficient practices that other wholesalers could profitably use. The study is designed especially to cover the following major areas: (1) A description of business operations and organizations (including voluntary chain development); (2) data on physical handling operations (including receiving, warehousing, order assembly, and delivery); (3) method of selecting customers; (4) brand policy; (5) pricing procedures, rebates, or discounts; (6) selling procedures and sales volumes; (7) informational aids; (8) promotional aids; (9) non-grocery and unrelated lines; and (10) additional services to retailers (including store engineering, training programs, continuous supervision, accounting aid, and cash-and-carry department). Several case studies have been made.

Another line of work is being undertaken in cooperation with the United States Wholesale Grocers' Association. This phase is similar in some respects to the other except that smaller wholesalers, doing relatively little of their business with voluntary groups, are being analyzed. The delivery function is being given special emphasis with such major areas covered as (1) delivery cost analyses based on customer selection, (2) sales analyses, (3) order routine, (4) order assembly, (5) loading and delivery methods, (6) truck routing methods, (7) measures of delivery costs, and (8) possible savings. Case studies of several wholesalers have been completed.

A third line of the wholesaler-retailer teamwork project is concerned with the retailer customers of the grocery wholesalers. An extensive survey of these retailers is being planned in order to determine their needs and methods which wholesalers can economically and effectively follow to satisfy these needs. The major areas to be covered in the retailer survey are: (1) General store operating policies; (2) wholesaler patronage; (3) brand policy; and (4) wholesalers' services such as advertising, pricing policies, supervisory aid from wholesalers, accounting methods, store engineering and layout, informational aids, wholesalers' training programs, material for merchandising and display efforts, and cash-and-carry service by wholesalers.

Improving the Efficiency of Departmental Display Space in Retail Food Stores

A survey of all the Washington, D. C., outlets of a major local chain indicated a considerable divergence of opinion and practice among retail store operators regarding the quantity of canned items which should be displayed. Other detailed preliminary work done in two large supermarkets indicated that there were possibilities of saving considerable selling space and inventories by reducing the size of many of the displays. These preliminary findings have been used to plan a latter phase of the project and to secure the interest and cooperation of the chain store organization for further research.

A controlled experiment has been begun to determine the relationship of the size of the shelf display of canned fruits and vegetables to the quantity sold. The experiment is being conducted in five supermarket outlets of a local chain and will be continued for about six months. A cross-section of canned fruits and vegetables, demand and impulse items, nationally advertised and packers' labels, and large and small can sizes is being tested.

TRANSPORTATION FACILITIES, EQUIPMENT, AND LOADING METHODS

The new set of conditions in the transportation of agricultural products which followed the outbreak of the Korean incident in June 1950 made necessary a reappraisal of the transportation research activities of the Branch, which fall into three general categories; (1) better utilization of equipment; (2) improvement of the various types of transportation equipment in use and in the facilities for loading and unloading them; and (3) research into methods of stowing, bracing, and shipping agricultural commodities.

THE TRANSPORTATION SITUATION

The most immediate and striking effect of the tightening international situation that resulted from the outbreak of hostilities in Korea was an increased demand for the transportation of goods of all kinds. In the years following World War II there had been an unusually heavy demand for transportation facilities which were required to satisfy the backlog of demand for consumer goods built up during the war. By early 1950 the volume of that movement had subsided; traffic levels, as reflected in weekly railroad carloadings, had declined; and the severe car shortages of 1947, 1948, and, to a lesser extent, 1949 had been largely overcome. While ownership of cars by the railroads had not increased and the number of boxcars, refrigerator cars, and livestock cars in service were actually fewer than in prior years, fewer cars were needed because of the decline in traffic.

This was all changed in the months following the crossing of the 38th parallel by North Korean troops. The country again began girding itself in preparation for possible further hostilities, and the movement of industrial and consumer goods, building supplies, and other commodities again boosted to high levels the demands for transportation equipment, particularly boxcars. At the same time production of agricultural commodities and the requirements for cars to move them remained heavy. Consequently, severe car shortages not experienced in years again plagued shippers and resulted in the holding back of movements of some agricultural commodities.

SIGNIFICANT DEVELOPMENTS IN TRANSPORTATION DURING THE YEAR

As a result of these conditions a number of significant changes took place in the field of the transportation of agricultural commodities.

1. An immediate development was an increase in interest on the part of the railroads in providing new equipment to minimize the car shortages. The number of boxcars on order by the railroads as of June 1, 1950, was 23,074 and the number of new cars of all types on order was 41,439. With monthly retirements of old equipment averaging approximately 6,000 per month and new cars installed running less than that figure, it was obvious that speedy and effective action was needed. A program was developed by the carriers aimed at the construction of 10,000 new freight cars a month, and with the assistance of allocations of steel for the car building program, monthly production increased steadily, reaching 9,644 in June, 1951--only a few

hundred cars under the 10,000 goal. On order as of June 1, 1951, were 55,016 boxcars, with orders for all types totaling 140,315.

Some decline in traffic in the last months of the fiscal year, together with improved utilization of cars through faster loading and unloading, speedier repair of bad-order cars, and other improvements in utilization developed by the carriers, were effective in reducing the severe car shortages of previous months. However, with the heavier levels of traffic expected in the fall, extreme shortages of cars are again anticipated.

2. There has been renewed interest in the reduction of delays in the handling of cars, particularly in the reduction of terminal delay.

3. Another manifestation of the conditions resulting from the shortages of railroad cars has been the continued increase in the movement of agricultural commodities by motortruck. The following data are based upon reports of the Market News Service on receipts of a number of commodities at terminal markets for both truck and rail arrivals. The percentages shown are of combined, rail, boat, and truck receipts.

Commodity	Percent moved by motortruck in		
	1950	1949	1948
Fresh fruits and vegetables	47.9	47.1	43.7
Livestock	75.2	71.9	68.6
Live poultry	99.4	98.8	97.5
Dressed poultry	76.3	69.4	56.0
Butter	59.1	55.5	43.8
Eggs (shell)	94.7	85.4	64.8

4. There has also been a small beginning in the regular transportation of perishables by air, one of the principal non-certificated carriers hauling a regular but relatively small amount of fresh fruits and vegetables from the Southwest to northern markets.

5. Scarcity of labor and high labor costs have brought about an increased interest in research into the development and use of pallets and unit loads in the transportation of farm products and manufactured foods to reduce the man-hours, and consequently the cost of labor, used in loading and unloading cars.

6. Another development is the increased concern being shown by carriers and shippers in the losses of goods in transit, from the standpoint of both the economic loss of labor and materials involved and the dollar costs to the railroads and truck lines in claim payments and to the shippers in collecting them. Furthermore, and this is true particularly in the transportation of perishable agricultural commodities, many of the effects of transit damage are not discernible at the time the shipment is received by the consignee; it is later, in the retail stores or after the commodity has been purchased by the housewife, that damage from bruising or temperature failure in transit develops.

7. With short supplies of materials for the construction of new equipment, it has become increasingly important that the equipment placed in service be adapted to safe and speedy transportation of agricultural commodities, including facility of loading and unloading, and the research into transportation equipment attains additional significance.

In the light of these changed conditions a review of the transportation research projects conducted in the Branch indicated some need for a shift in emphasis in connection with certain portions of the program. The intensity of the car shortages of the past year and the prospect of increased shortages ahead emphasized the need for continued study in the field of improved utilization of carrier equipment. In view of the increasing difficulty of manufacturers in obtaining lightweight metals and alloys that would normally contribute to improved efficiency in carrier equipment, it was clear that in the immediate future our aim must be directed toward improvements in existing equipment that may be made with materials in greater supply, and that can be effective with a minimum of change from present models because of the difficulty of making any major change-over during the present critical period. In the study of improved loading methods for the shipment of farm products, scarcity of container materials and labor for loading and unloading cars indicated the need for increased emphasis upon the development of master containers which may be reused and which are adapted to loading and unloading through the use of standard materials-handling equipment. An important phase of transportation research during this year has been in the endeavor to reduce loss and damage, particularly to perishable commodities. Although there have been no shortages of refrigerator cars of consequence up to this time because of the declining volume of perishables moved by railroad, shippers of fresh fruits and vegetables, dairy products, and other perishables are concerned about the possibility of orders of the Defense Transportation Administration requiring heavier loading of cars, which in those commodities may contribute to substantial increases in loss and damage. One of the objectives of work in the next fiscal year will be the study of the effect of heavier loading on various commodities.

UTILIZATION OF CARRIER EQUIPMENT

The serious car shortages of the past year point out the importance of attaining better utilization of carrier equipment, particularly of boxcars, for the transportation of agricultural commodities. The shipper primarily is interested in two things: That a car be available when he has a sale for his product and wants to move it, and that it receive prompt and dependable transportation so that it will reach his customer without delay. This is particularly important in the transportation of those commodities that have heavy production and a short harvest season.

An additional dividend would be realized through the improved utilization of carrier equipment because the more times an individual car may be used during the year, the fewer total cars are necessary in the performance of the complete transportation job. Therefore the need for additional investment in new equipment, with attendant expenses of amortization, interest, and taxes, should diminish, lessening the need for continued demands for increased freight rates. There have been seven general freight rate increases since the end of World War II.

During the year the railroads have shown an increasing consciousness of the need for the prompt handling of equipment and the minimizing of terminal delays. The annual report for fiscal year 1950 reported on a study of the movement of some 36,000 carloads of agricultural commodities, in which a simple formula for the measurement of delays through the use of data available to the carriers was developed. This statistical unit, which is called a "movement ratio," simply is a factor for relating the actual time and distance of a loaded car in transit from origin to destination to the speed of the trains in which it is handled so that the amount of time that the car is moving or standing still may be readily ascertained. The objective of the use of this statistical unit is to assist the railroads in finding the terminals in which the greatest delays are being experienced, or in determining the operating policies that in themselves may be a cause of delay. An explanation of the "movement ratio" idea and its application is being transmitted informally to approximately 50 presidents of the principal railroads hauling agricultural commodities, with the suggestion that the idea be adapted by them to their operation.

Up to this time theutilization studies have entailed the accumulation of masses of data relating to movement of individual cars, a laborious and time-consuming task. During this year we have devoted intensive study to all types of operating statistics available through reports made public by the Interstate Commerce Commission, the Association of American Railroads, and the individual railroads in the endeavor to develop a statistical formula for the accurate measurement of the performance of the individual railroads, those operating in a single region of the country, or for the country as a whole, that, applied to the monthly, quarterly, or annual statistics would provide a historical series that will give a better picture of the efficiency of the railroads in the movement of freight and the handling of equipment than is now available. Voluminous operating statistics are now published on a monthly, quarterly, and annual basis. The chief difficulty has been that the statistics with respect to car movement combined both empty and loaded cars. For many reasons empty cars that are standing still may be doing so not through any fault of the carriers' employees. They may be held with the anticipation of loading by shippers or they may have been sent to the shipper for loading and the shipper has not yet begun the loading process. Again, there has been no way of separating the time utilized by the shipper in loading and unloading cars so that the responsibility of the carrier is not always clear.

At the close of the fiscal year this endeavor was still proceeding. Discussions had been had with statisticians of the railroads and the Interstate Commerce Commission, and suggestions have been made for the collection of certain additional data that it is believed would provide the necessary means of securing current statistics that would disclose the comparative efficiency of the carriers in the handling of loaded and empty cars separately.

An exacting study has been made during the current year of the movement of approximately 100 test shipments obtained under another project for the purpose of determining the movement of perishables through all of the intermediate terminals between Pacific Coast points and the East, preliminary to a study to be conducted during the next fiscal year of the schedules and performance in the transcontinental movement of traffic.

IMPROVEMENT OF TRANSPORTATION EQUIPMENT

The serious losses of food products that occur annually and the tremendous cost of these losses to shippers and carriers are due in part to inadequate equipment and in part to poor methods of loading or the containers that are used for the transportation of the commodity. These factors are of approximately equal importance.

Railroad Refrigerator Cars

In the annual report for the past year, mention was made of the development of a mechanically refrigerated railroad car designed to afford thermostatically controlled temperatures ranging from 0° to +70° F., within the range of climatic, sectional, and seasonal conditions in the United States.

The standard railroad refrigerator car is not capable of maintaining zero temperatures, its best performance being in the range of +15° upward. Indeed, until the marketing of frozen foods became an important factor in the distribution of perishable commodities, temperatures below 15° were not necessary. With the growth of the frozen food industry the railroad car lines produced a limited number of heavily insulated cars for this service. These new cars ordinarily had 6 inches of insulation in the walls, ceiling, and floor of the car instead of the 3½ to 4½ inches commonly found in the standard refrigerator car. Used with water ice plus 30 percent salt, these cars were satisfactory for the transportation of many frozen foods, but shippers still were dissatisfied and insisted that frozen foods should be moved at temperatures approximating 0°.

This demand for lower refrigeration was intensified with the development of the frozen citrus concentrate industry. Because of the high perishability of that commodity, shippers have insisted upon equipment that is capable of maintaining 0° F. during the warm months. Research work in this field during the year was based upon the use of frozen citrus concentrate as the commodity in the equipment being tested. Tests were made of 11 refrigerator cars using three different methods of refrigeration. Mechanical refrigeration, dry ice (solid carbon dioxide), and water ice plus 30 percent salt. These tests were conducted in the transportation of concentrate from Florida to northern markets.

The most satisfactory performance was given by the two mechanically refrigerated cars. One of these cars, equipped with gasoline-powered units, was described in our annual report for the past year. The other, a more recent development, is equipped with a single Diesel-operated unit. Both cars gave satisfactory performances. Commodity temperatures were maintained within 0.5° of the loading averages, -1.5° and -3.5° in two tests and reduced 5° from an average of 0° in another test, indicating ample refrigerating capacity and adequate air circulation. The maximum temperature encountered in any part of these cars was 4°.

Two of the dry ice cars gave satisfactory results, maintaining average commodity temperatures at or slightly below the temperatures at time of loading, -3° and 0.5°. During the transit period of the other dry ice car, which was in warmer weather, there was a 6.5° rise in the average temperature, maximum temperatures in some areas in the car as high as 9° being found.

Temperatures in the overhead bunker cars ranged upward to a maximum of 16.5°. while one end bunker fan car with 1,000 pounds of dry ice on top of the load carried with a maximum temperature of 9.5°. The bunker fan car with ice and salt only, gave the least satisfactory performance with an average temperature at destination of 10.5°, maximum temperatures of 18.5° being found.

A report covering the results of these tests on railroad refrigerator cars, as well as tests on refrigerated truck equipment, discussed below, was in the hands of the printer at the close of the fiscal year. This project was conducted in cooperation with the Bureau of Plant Industry, Soils, and Agricultural Engineering of the Department.

Refrigerated Motortrucks

A considerable volume of frozen foods are transported by motor vehicle. Most of these trucks are equipped with mechanical refrigeration and six inches of insulation, although dry ice is sometimes used. A total of 23 truck tests was made from April through October 1950 in the transportation of frozen citrus concentrate from Florida to northern destinations, in which two of the trucks used dry ice and the balance were equipped with mechanical refrigeration.

The earlier tests indicated that although the refrigerating units had ample capacity for the provision of zero temperatures in the trailer, the circulation of air within the trailer was inadequate. As a consequence, "hot spots" would be found in the load at destination with temperatures as high as 16° or 18° F. This inadequate circulation resulted principally from lack of floor racks or means by which the refrigerated air could be circulated along the floor underneath the load. Therefore much of the air coming from the unit was short-circuited across the top of the load and never did satisfactorily perform its function. To correct this condition, it was suggested that a return air duct, which could be built at nominal cost, be installed in order that return air might be drawn from the floor rather than back over the top of the load. The floors in this equipment were provided with channels generally 3/4 inch deep and 3/4 to 1¼ inch wide, running the length of the trailer. Better circulation probably could have been obtained through the installation of new floor racks providing greater space for circulation of air under the load. But because of cost and the additional weight involved, it was suggested that the bottom layer of packages in the trailer be one package less in width than the upper layers and that they be so arranged that the extra space provide channels along each side of the trailer next to the floor.

With these modifications, the later tests showed considerable improvement with average commodity temperatures being reduced from 2.5° to 0.5° in one test and from 2.5° to -3° in another, the "hot spots" being virtually eliminated. The modified trailer is illustrated in figure 1.

In the spring of 1951, additional truck tests were conducted with a truck trailer equipped with a new type of dry ice bunker. Standing tests of the unit were made in Florida before a road test was undertaken. In the road test the test trailer was accompanied by a conventional trailer with mechanical refrigeration as a control. A report on this project is being prepared.

Grain Transportation

One of the prominent phases of research in the Branch into improvement of carrier equipment and improved carrier utilization of equipment is concerned with the study of the movement of grain. Grain is usually moved in the familiar railroad boxcar. When it is so loaded, auxiliary grain doors composed of wooden sections must be fastened inside the car door in order to prevent leakage of grain from the car. The installation of these doors and the preparation of the car for receipt of the grain require considerable time on the part of the shippers' employees.

As pointed out in the report for the past fiscal year, upon arrival at destination, the grain is usually removed by one of two methods. The most commonly used is that in which the auxiliary grain doors are pried loose, permitting some of the grain in the middle of the car to run into a pit beneath the car which receives the grain for elevation into the elevator. When as much of this grain as possible has run out, a scoop pulled by a winch and cable and directed by one of the men unloading the car is used to draw the grain to the doorway. After most of the grain has been removed by this method, the rest is swept out. This process is costly and time-consuming.

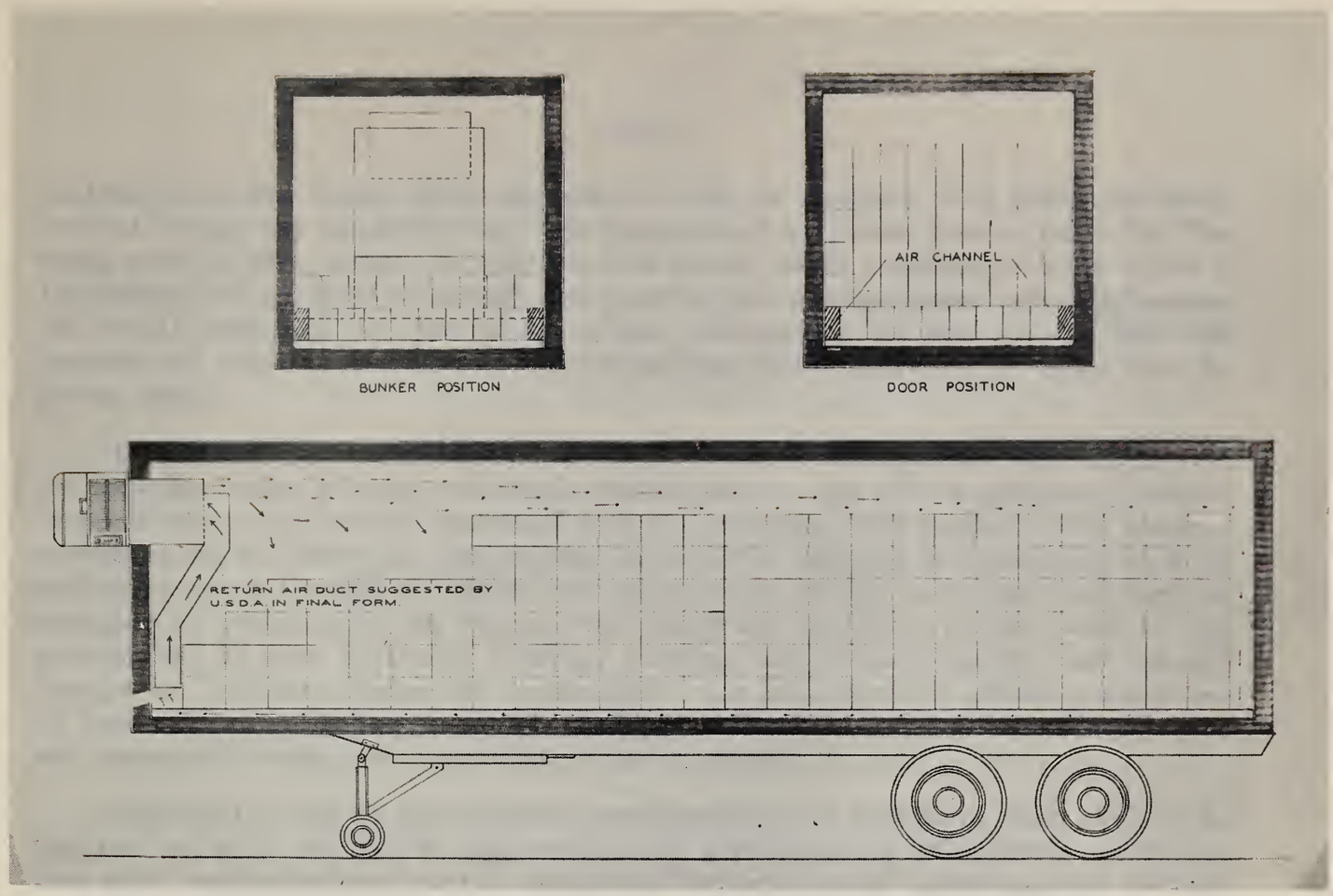
The other method requires the use of a mechanical car dump, the installation cost of which may run into several hundred thousand dollars. The mechanical dump tilts the car sideways and from end to end, permitting the grain to run out of the car by gravity into the pit beneath the car. This operation may be done in 7 to 10 minutes, but obviously a heavy volume of grain must be moved through the elevator to justify the expense of such equipment.

Various means by which the cars may be unloaded with less labor and expense have been studied, and contacts have been established with several firms which are working on the problem of finding faster and cheaper means of unloading cars. A proposed contract for the study of the use of vibration to speed unloading of cars is now under consideration. It is hoped that within the next fiscal year these efforts will have proceeded far enough so that one or more of the new developments may have been tested.

In connection with this work, a study is being made of the loading, transportation, and unloading of grain moved by rail and by truck from a typical sample of country elevators to the principal grain markets in Oklahoma and Texas. In this area, the last few years have seen a great increase in the movement of grain by motortruck. One of the purposes of this study is to evaluate this development and its advantages and disadvantages in comparison with the movement of grain by railroad.

IMPROVEMENT OF LOADING, BRACING AND SHIPPING OF PERISHABLE AGRICULTURAL COMMODITIES

Loss, damage, and spoilage in the transportation of many perishable and agricultural products continued at a relatively high level during the year. Although there was some improvement in this situation, as indicated by the lower rate of



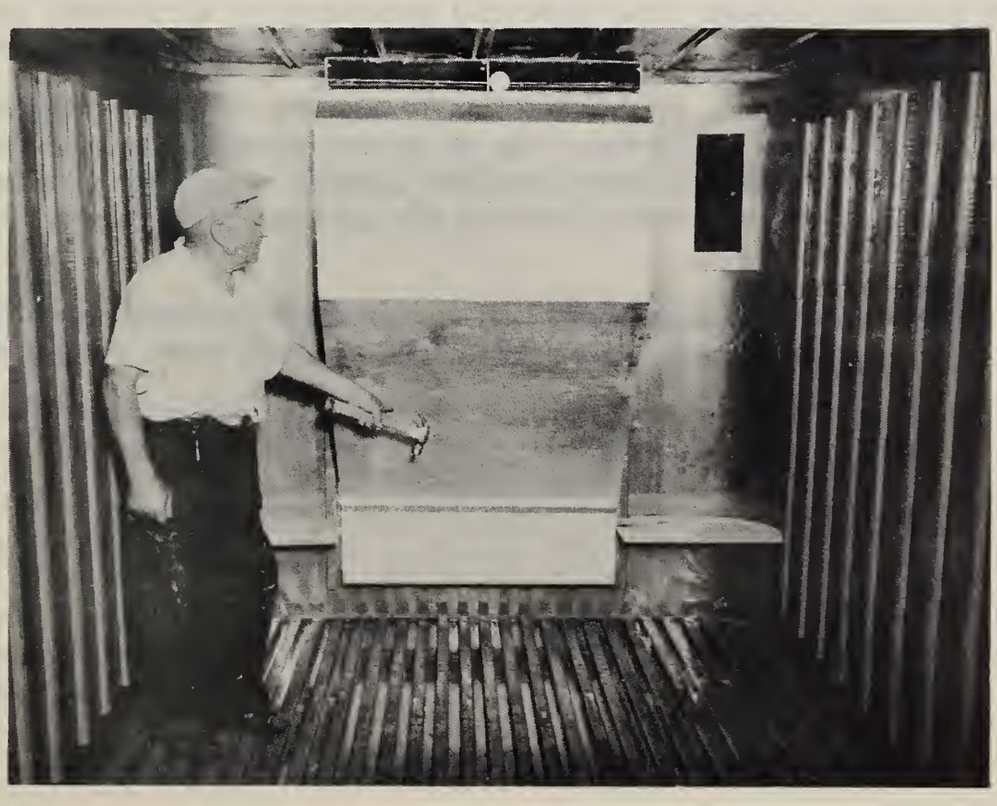


Figure 1.--Modified truck-trailer providing better circulation of air for transportation of frozen citrus concentrate.

railroad loss and damage claim payments in 1950 as compared with 1949, the total cost of damage was several times that experienced in prewar years (table 2). The total cost of this damage, as reflected in damage claim payments by U. S. Class 1 railroads, has remained at a high level during the postwar years not only because the actual amount of loss and damage of many commodities has been greater but also because the value of the commodities so lost has been considerably higher than in prewar years.

The greatly increased cost of the loss, damage, and spoilage associated with the transportation of some perishable commodities is one of the principal factors contributing to the greatly increased cost of marketing these products. The research carried on by the Branch in this particular field is aimed at the reduction of these marketing costs through the study and development of new techniques and devices designed to reduce loss and damage. The immediate objective of this work is the development of more efficient loading, stowing, and bracing methods and related changes in container design and construction that will not only effect a reduction of loss and damage during transportation, but that will also facilitate more rapid and economical loading and unloading of the shipments.

Practically all of the research performed by the Branch on this subject is carried out with the active cooperation and participation of growers, shippers, container manufacturers, carlot receivers, transportation agencies, and various other interested groups. Part of the work is performed directly by Branch personnel, while certain other portions or phases of some projects are carried out under contract. The endeavor is to coordinate this work with research conducted by other Government agencies, carriers, and various trade groups.

In addition, a limited program of service work is carried on by the Branch. This work is designed to further the use by the trade of the more efficient loading, bracing, and transportation methods that are developed and to assist growers, shippers, and receivers in adapting the improved methods and devices to their own operations.

The following reports, which were in the processing room at the close of the previous fiscal year, were released during the current year:

Loss and Damage in Rail Transportation of Watermelons in Relation to Variety of Melon, Type of Car, and Type of Protective Material.

Reduction of Loss and Damage in Rail Transportation of Shell Eggs by Improved Loading and Bracing.

Between 2,000 and 3,000 copies of each of these reports, the contents of which were discussed in last year's annual report, were distributed to shippers, transportation agencies, and other interested groups.

Improved Loading and Bracing for Vegetables and Melons

A major part of the work of the Branch directed toward the development of improved loading, bracing, and transportation methods for vegetables and melons is

Table 2.- Loss and damage per car for selected representative commodities, 1939, 1949, and 1950 1/

Commodity	1939		1949		1950		Percentage change per car	
	Total carload loss and damage	Per car loss and damage	Total carload loss and damage	Per car loss and damage	Total carload loss and damage	Per car loss and damage	From 1939 to 1950 (Increase)	From 1949 to 1950
	Dollars	Dollars	Dollars	Dollars	Dollars	Dollars	Percent	Percent
Tomatoes	275,883	9.74	1,824,772	74.22	1,231,422	57.89	494.4	-22.0
Honeydew melons	99,773	22.22	219,135	52.66	138,476	31.24	40.6	-40.7
Peppers	17,758	14.71	132,873	55.55	99,153	39.13	166.0	-29.6
Cantaloups	203,028	15.41	1,476,572	66.98	1,045,169	35.42	129.9	-47.1
Cucumbers	50,903	16.18	129,951	64.75	81,690	56.61	249.9	-12.6
Peaches	133,228	6.65	810,891	63.51	304,128	34.75	422.6	-45.3
Plums and prunes	80,358	12.85	250,185	36.40	189,947	36.83	186.6	+ 1.2
Turnips	1,533	3.39	5,758	8.81	15,712	30.10	787.9	+241.7
Pears	60,114	3.32	349,071	20.64	259,429	18.78	465.7	- 9.0
Watermelons	270,937	15.33	1,114,847	39.12	905,866	37.46	144.4	- 4.2
Grapes	379,548	11.95	915,732	35.82	537,222	22.94	92.0	-36.0
Carrots	141,518	10.42	613,076	26.80	453,763	18.72	79.7	-30.1
Cauliflower	45,532	5.95	208,559	29.23	149,767	25.67	331.4	-12.2
Celery	115,237	5.83	564,009	22.48	443,368	17.60	201.9	-21.7
Oranges	286,933	4.30	1,317,325	21.40	973,618	17.33	303.0	-19.0
Lettuce	416,678	7.95	1,661,454	23.62	1,353,779	18.09	127.5	-23.4
Apples	193,835	3.79	781,407	23.66	629,598	18.93	399.5	-20.0
Spinach	24,067	3.81	56,637	24.07	41,787	23.53	517.6	- 2.2
Lemons	54,633	2.69	404,850	30.31	316,753	24.41	807.4	-19.5
Grapefruit	76,127	2.64	397,248	23.81	194,008	14.62	453.8	-38.6
Mixed vegetables	115,473	4.30	438,905	15.40	340,794	11.38	164.7	-26.1
Cabbage	86,947	4.64	248,430	13.13	118,027	7.94	71.1	-39.5
Onions	53,390	1.93	279,794	9.55	263,418	9.77	406.2	+ 2.3
Potatoes (sweet)	20,329	2.37	65,116	16.36	34,001	8.16	244.3	-50.1
Potatoes (white)	186,486	.99	1,417,007	5.63	1,304,763	5.96	502.0	+ 5.9
Bananas	59,053	.72	284,139	3.21	215,582	2.31	220.8	-28.0
Eggs (shell)	135,201	4.88	1,316,763	145.71	509,318	129.73	2,558.4	-11.0
Fresh and cured meats	232,401	.69	2,041,743	5.45	1,587,358	4.42	540.6	-18.9
Total	3,816,903	xx	19,326,249	xx	13,737,916	xx	2/ 259.9	3/ -28.9

1/ Annual Reports of Freight Claim Division, Association of American Railroads, 1940, 1950, and 1951.

2/ Percentage increase in total loss and damage for the commodities listed.

3/ Percentage decrease in total loss and damage for the commodities listed.

carried out under contract by the Research Division of the Western Growers Association. This work embraces an extensive program of field, laboratory, and transcontinental shipping tests for purposes of developing more efficient and less expensive methods of shipping and handling these products.

Development of a new and more efficient container for lettuce and carrots (also suitable for other vegetables), mentioned briefly in last year's annual report, was completed during the year. This container, popularly known in trade circles as the WGA crate, has been formally adopted by vegetable growers and shippers in California, Arizona, Texas, New Mexico, and all other producing areas west of the Mississippi River. It was developed specifically to fit the larger heads of lettuce which had resulted from the introduction and use of improved seed and cultural practices in lettuce producing areas over a period of about 30 years--since the old Los Angeles crate became the standard container of the trade.

A series of experimental transcontinental shipping tests indicated that the new container would deliver a greater quantity of salable lettuce with less bruising and waste than the old Los Angeles crate. Because large stocks of box shook cut to the specifications of the old crate were on hand when the decision was made to adopt the new WGA crate, the Interstate Commerce Commission was persuaded to postpone the effective date of its order restricting the bulge on lettuce and carrot packages to 1-5/8 inches in order to permit the old stocks to be used. The new crate, ½ inch greater in height than the old crate, is designed to accommodate the bulge of 1-5/8 inches. Consequently, it was not until March 1951 that shipments were made in volume in the WGA crate. In the months of March, April, and May 1951 breakage in 6,440 cars of lettuce and carrots shipped in the new WGA crate, as reported by the Railroad Perishable Inspection Agency, averaged about 50 percent less breakage than that experienced with the old Los Angeles crate during the same period. At the request of the Branch, the railroad agency will tabulate and furnish data on damage found in all cars of lettuce and carrots unloaded in 41 terminal markets during the entire calendar year of 1951.

If the smaller amount of breakage so far experienced with the WGA crate is borne out by the records of subsequent months, the savings from that source alone should approximate $725,000 on a year's shipments.

Beginning about July 1, 1950, the cooperative program of work with the Western Growers Association was directed toward the problem of reducing excessive loss and damage in transcontinental rail shipments of cantaloups. Because of the relatively short shipping season, this work could be carried on only until October 1. During this 3-month period, however, a total of 45 test shipments were completed, in the course of which a completely new and more efficient method of loading cantaloup crates, upright on their ends, instead of lengthwise on their sides, was thoroughly tested. Figures 2 and 3 show the two loading methods. A series of paired loads shipped from the same point of origin to the same destination with special impact-recording instruments in the cars revealed the superiority of this new method of loading over the conventional lengthwise-on-sides method. An interim report on this study entitled *Reduction of Cantaloup Loss and Damage in Rail Transportation Through Use of the Upright Loading Method* was issued in April 1951.

It was developed that use of the new on-end, or upright, method of loading cantaloup crates for shipment would produce substantial economies for shippers, distributors, transportation agencies, and other groups engaged in transporting and marketing this commodity. Shipments in which this new loading method was used were found to suffer only one-third as much container breakage under the same shipping and handling conditions as those in which the conventional lengthwise loading method was used. On the basis of 1950 loss and damage claim payments for container breakage, a savings of approximately $450,000 in container damage alone should result from the universal adoption of this method of loading cantaloup crates for rail shipment. During the current 1951 shipping season a large number of cantaloup shippers in various producing sections of California and Arizona have been using this method. To date approximately 350 cars have been shipped, and the results have been very encouraging. More shippers are loading on-end each week. Field representatives of the Association of American Railroads, the Transcontinental Freight Bureau, the Wooden Box Institute, and the Western Growers Association have been working closely with many shippers to obtain a more widespread use of the new loading method and to assist them in adapting it to their packing and loading operations. Additional research is also being conducted during the current shipping season by WGA research workers for the purpose of developing further refinements in the method, and to obtain, if possible, greater economies in loading.

It was also found that since it is possible to load 24 more crates in each car by use of the on-end loading method, two additional important savings should result. This larger load makes it possible to transport the same quantity of melons in 16 cars that require 17 when the crates are loaded by the old lengthwise method. This saving of 1 car out of every 17, or approximately 1,700 per year, is particularly important in view of the present shortages of refrigerator cars throughout the country. The on-end method with 24 additional crates in each car also will produce a saving in refrigeration cost of about 5 cents per crate, or $275,000 on a year's shipments on the basis of present rail refrigeration charges. Also important is the 50-percent reduction in melon bruising that was found to result from the use of the on-end loading method. From the standpoint of our current national defense preparations, the very substantial savings in food, container material, and labor that should result from the imminent use of this new and more efficient loading method will be particularly important.

WGA research workers are now trying to develop through or solid on-end loads in which no center gate is used and which contain 12 additional crates per car, or 36 more than the conventional lengthwise load. If they are successful, the potential savings in refrigeration costs and number of cars required for transportation will be even larger than those listed.

During the course of the research on cantaloups 10,000 melons were measured in order to obtain data as a basis for possible modification of the present cantaloup crate. Test weights on 354 crates, or approximately 3,750 melons, were also taken to determine the amount of shrinkage in the melons under different conditions of storage and handling. Twenty-two test shipments of cantaloups by motortruck were also completed during the year. The data and information developed in this phase of the work are currently being analyzed in preparation for an over-all report on the project.

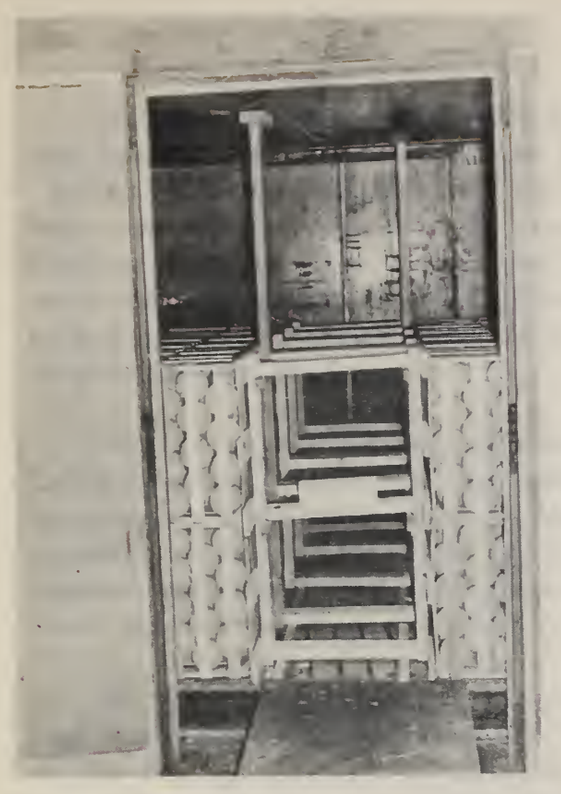


Figure 2.--Doorway view of upright load of cantaloups showing arrangement of crates and center gate.

Figure 3.--Top layer view of conventional lengthwise load of cantaloups showing excessive crate breakage and spilling of melons.

At the close of the cantaloup shipping season in October 1950, the transportation and loading research work of the Western Growers Association was shifted to the problem of loss and damage in celery shipments. Twenty-eight test shipments by rail were completed in the 6-month period ending in May 1951. A new on-end method of loading nailed celery crates was designed which proved to be very effective in reducing in-transit breakage. However, some evidence of decay in certain of the on-end celery shipments makes it advisable to conduct additional tests before any conclusions are reached.

Stalks in approximately 300 crates of celery in various shipping areas of California and Arizona were measured and weighed in order to determine what changes in container dimensions might be desirable in order to have the crate better fit the commodity. Drainage tests and check weights of a number of crates were also made in various west coast producing areas. This information is also being analyzed as the first step in the preparation of a report on this subject.

An amendment to the present contract with the Western Growers Association was negotiated during the current year which provides for an extension of the research on the development of more efficient methods of loading and shipping cauliflower and broccoli, as well as for additional study of celery and melon shipments. The work on cauliflower and broccoli will be undertaken when the shipping season for these commodities from the west coast producing areas begins in the fall of 1951.

Loss and Damage in Transportation of Dressed Beef

Inspection records covering approximately 3,650 carloads of dressed beef unloaded at seven terminal markets, obtained during the previous year through the Railroad Perishable Inspection Agency, were analyzed during the current year. A list of 258 so-called repeater cars, or cars which, over a period of one year, have shown some damage in 4 or more trips or in at least 20 percent of the loads carried during that time, was compiled. Special arrangements were made with the Baltimore and Ohio and Pennsylvania Railroads whereby all daily arrivals of meat at Washington, D. C., are reported to the Department. When any repeater cars are found among the daily arrivals, they are inspected to determine what conditions of the running gear or car bodies may contribute to their poor performance record.

This phase of the work revealed a very high degree of correlation between poor maintenance of the running gears of the meat-type refrigerator cars and high rates of damage in most loads of meat transported in them. It is planned to bring the information concerning the damage records and mechanical conditions of individual cars to the attention of the owning refrigerator car lines in order that they may take the necessary steps to correct the mechanical defects. At the close of the year final analyses of the results had been almost completed.

Another program of shipping tests designed to determine the effects of different types and degrees of shocks and vibrations encountered in rail transportation upon shipments of dressed beef was inaugurated during the year in cooperation with the North American Car Corporation and several meat packers in the Midwest. Because of some difficulties with the special two-way ride recording instruments used in these

tests which delayed the work several months, only 14 test shipments were completed during the year. The Federal Meat Grading Service of the Livestock Branch, Production and Marketing Administration, cooperated in this work.

Development of Large, Collapsible, Reusable Containers

In response to urgent recommendations of the Transportation Advisory Committee and some of the commodity advisory committees, a project to determine the feasibility of developing large, collapsible, reusable, pallet-type containers, adaptable to fork-lift truck handling, for the transportation of consumer size packages of various perishables was initiated during the year. During the early part of the year a limited survey for the purpose of developing certain information required in planning the work was completed.

Due primarily to difficulties encountered in obtaining the large, collapsible wire containers and other related equipment, test shipments under this project were not begun until late in the current year. Beginning in March 1951 several test shipments of oranges in 5-pound bags, packed in large, collapsible wire containers in quantities of 115 bags per container, were made by motortruck from Winter Haven, Fla., to Newark, N. J. This was followed by one rail shipment during the month of May in which 208 bags, or approximately 1,300 pounds of fruit, were packed in a large type of container. (See fig. 4.) The car was loaded and unloaded with electric fork trucks. Cooperating with the Branch in the program were representatives of the Atlantic Commission Company; the Pittsburgh Steel Company; Union Steel Products Company; Seaboard Railroad; Fruit Growers Express Company; Federal-State Inspection Service; and the Bureau of Plant Industry, Soils, and Agricultural Engineering, U. S. Department of Agriculture.

At this point, however, the shortage of fruit due to the approaching end of the Florida shipping season and various other developments made it advisable to discontinue further test shipments for the balance of the season. It is planned to resume this work at the beginning of the next shipping season for Florida oranges in the fall of 1951.

Figure 4.--Mechanized handling and loading of 5-pound mesh bags of oranges in large collapsible, re-usable wire containers. Each of the two containers shown here contain 208 bags, or approximately 1,300 pounds of fruit. Note folded, or collapsed, containers in background.

BASIC STUDIES TO ACHIEVE TECHNICAL IMPROVEMENT IN MARKET NEWS, GRADING, AND INSPECTION

The orderly movement of farm crops through marketing channels, the establishment of fair and honest market prices, and the transmittal of returns back to producers in line with the quality of the product produced depend upon the existence of good market news information and a good system for grading agricultural products. To achieve these ends, basic studies were carried on into problems of improving market news and standards for grades, and the inspection and grading of agricultural products. Some of the studies undertaken were relatively simple in nature, such as a review of the extent to which the Federal-State inspection services are used by States in the grading of fresh and processed fruits and vegetables. Others were exceedingly complex, such as the full-scale experimental reporting of retail food prices on 125 items and the reporting of volume of sales on 40 items.

IMPROVING THE EFFECTIVENESS OF WHOLESALE MARKET NEWS

Program for Development of the Market News Service

During the fiscal year ended June 30, 1950, at the request of Congress a program for development of the Market News Service was prepared in cooperation with the Office of the Administrator of PMA, and the six commodity market news services. No further research work was done during fiscal year ended June 30, 1951, but it is worth noting that many phases of the work called for in this program for development were undertaken as part of the regular market news service. Some of the work undertaken includes (1) the reporting of wholesale meat markets at Boston and Philadelphia; (2) the issuing of reports on truck shipments of fruits and vegetables from California, Florida, and Texas; (3) the opening up of a new seasonal market news office on fruits and vegetables at Humboldt, Tenn.; (4) the expansion of service on poultry and eggs at several major markets; (5) the supplying of additional technical services on hay, grain, and feed reports; and (6) the establishment at Savannah, Ga., of the first market news office on naval stores. It is anticipated that the additional features of this program for development of the Market News Service will be undertaken, using this report as a guide, as funds become available.

Development and Testing of Methods of Reporting Prices for Butter Received by Creameries

A study of the practicability and need for market news reporting of prices received by creameries was begun in September 1949 at the request of the Iowa Creameries' Association. Actual experimental reporting was carried on through September 1950, and a manuscript has been prepared on the results of the experimental service.

The findings of the study, in general, substantiate the belief of the Iowa creameries that the terminal market quotations, which information is all that is normally available to them, were not adequately reflecting the prices being paid to creameries. Comparisons of terminal market quotations with prices creameries received for the period of reporting brought out that terminal market quotations for

Grade B butter usually were substantially lower than the average prices creameries received, and because of the widespread practice of selling on the basis of New York or Chicago quotations, many could easily be misled as to the adequacy of the prices they were receiving. It also was found that the range of prices for both Grade A and Grade B butter reported by creameries was about 2 cents per pound wide above that reported in terminal market quotations, and that the average difference between the price of Grade A and Grade B butter reported by creameries was only 0.5 cent as compared with 1.4 cents reported in New York and 1.8 cents reported in Chicago.

The wholesale job-lot prices of butter sold locally by creameries showed that usually there was little price distinction between Grades A and B in local sales; that the average price difference between the print butter in cartons and that in parchment wraps was less than the cost of cartoning; and that price differences among creameries of the same grade and package sold locally were wide--in some weeks as much as 6 cents.

To test the practical uses of the experimental butter report it was sent to a list of 618 creamery managers, owners, and directors. At the end of the trial period they were surveyed. Ninety percent of the creamery managers and owners and 58 percent of the directors reported using the information. The most important uses reported by managers and owners were in bargaining to secure more favorable wholesale prices or in assuring themselves that their prices were satisfactory. A number also reported use of the information in setting local prices and in making management decisions regarding marketing and production. Directors reported their chief value from the report to be improved knowledge of prices. A few directors reported use of the information in bargaining, local pricing, and management decisions. Approximately 80 percent of the managers, owners, and directors expressed a desire to continue getting the report.

Information as to the grade of butter sold is essential to an intelligible report, and it was found that such grade information could not be reliably obtained from creameries. Hence, a method for checking grades on a sample basis by a Federal grader was developed.

It was concluded that market news reporting of prices received by creameries was desirable and needed, but that daily reporting was not necessary. Rather, it was found that in a period of stable prices, a monthly report, and under unstable prices, a weekly report, would be adequate. It was estimated on the basis of an experimental study that the cost of a monthly service would be approximately $10,800 a year and a weekly service $16,200 a year.

It is interesting how a study such as this frequently has many side benefits which alone sometimes more than pay for the cost of the work. For example, one of the large creameries found from examining the experimental reports that while its gross prices received in the terminal market were in line, its net prices were low in comparison with other creameries. After some looking into the matter the creamery found that it had been overcharged on freight for years. Now that the matter is straightened out, it is saving roughly $15,000 annually.

Uniformity in Market News Reporting

Because of differences in trade practices and terminology among markets and because of the way market news has grown over the years, market by market, numerous differences in reporting have arisen, yet it is very important to shippers and producers that comparable information be made available from the various markets if the market reports are to be useful in determining the most favorable market to which to ship their products. In order to aid in bringing about more uniformity in reporting, a tabulation of all dairy and poultry market news information was completed, showing the detailed bases of reporting being used in each market including class, type, age, color and kinds of products reported, degree of processing, weight groupings, size groupings, methods of reporting grades, kinds of packages, size of lot, market level reported (retail, wholesale selling prices, wholesale buying prices, f.o.b.), condition of sale, and point of delivery. It was found that considerable differences existed among the data reported for various markets, and reports prepared on each of the following have been made available for administrative use in reducing the differences between markets: Butter, cheese, frozen and dried eggs, shell eggs, live poultry and rabbits, dressed poultry, and dairy products other than butter and cheese.

Use of Market News by Daily Newspapers

The Federal-State Market News Services depend heavily upon private newspapers and radio stations to carry the market reports to the producers, tradespeople, and other interested persons. In order that an appraisal could be made of the adequacy of the job being done by daily newspapers in making use of market information given them, a survey was made of all the English language daily newspapers in the United States, including agriculture and trade papers. The Associated Press, United Press, and International Press Services, which carry the market news information over their leased wire services, furnished copies of many of the newspapers. Other newspapers which are supplied information directly by the market news offices were sent in by the market news reporters. Sixteen hundred out of the approximately 1,800 daily English language newspapers in the United States were received, and the market news information carried in them has been tabulated as to the kind of information and the city in which it originated. This material is yet to be analyzed.

Effectiveness of Market News Dissemination

Under a contract with Iowa State College the study was continued on the effectiveness of radio, newspapers, and mimeographed reports in getting market news to Iowa farmers. A manuscript was completed entitled *What Does the Iowa Farmer Want from Radio Market News,* and is to be published by Iowa State College. This study disclosed that 92 percent of Iowa farm operators listened to daily broadcasts of market news before selling their products. It was found that for selling hogs and cattle, farmers preferred to hear the market news of the interior packing plants and the large terminal markets. When selling grain, farmers wanted their grain reports to cover the nearby local points and the large terminal markets. In selling cream and eggs, they preferred market news that would cover their own local conditions. Eighty-six percent of Iowa's farmers selling hogs depended more on their radios than

upon any other medium for getting hog market information. Sixty-three percent rated radio at the top when selling cattle. By contrast, less than 15 percent of those selling eggs and cream said radio was the most important source of information.

Radio broadcasts of the complete summary of market prices including top, range and low for all markets were favored by 69 percent of the farmers. The farmers also indicated a desire to receive information on the grades of products they sold. They indicated that some of the programs were too early or too late to be of use to them and that much of the information reported was not on the local areas but on distant ones. Many farmers indicated a desire for "outlook" information and wanted it on a daily broadcast around noon.

When published, this report will be available for the Department as a guide in how to better get the kind of information out to farmers that they want and will also be available to radio farm directors and others interested in improving the radio dissemination of market news.

Under this contract work was also done on two other reports which are not yet complete, to be entitled: *What Does the Iowa Farmer Want in Newspaper Market News,* and *How Iowa Farmers Obtain and Use Market News.*

Development and Testing Practicability of Local Feed Market News Reporting

The Market News Service at present reports on grain and hay in the principal markets, but methods have never been developed to permit the reporting of localized feed information needed by poultrymen, dairymen, and livestock feeders. Because the purchase of feeds directly affects the production and cost of poultry, dairy products, and meat, such information is particularly needed, and a contract was let with the University of Arkansas to do the field work necessary to test methods that might be used for such reporting. The plan of work for the study has been developed and the work started in June 1951.

Special attention will be given to the reporting of the relative value of feeds in terms of current prices, the current prices of feeds in the local feeding areas, and information on current and prospective supply situations for feeds coming into the area from out-of-State sources.

EXPERIMENTAL RETAIL MARKET NEWS SERVICE IN BALTIMORE, MD.

Numerous proposals have been received that the Department report retail market news as a part of the regular market news reporting service. Also, in recent years there has been increasing activity in programs of consumer education designed to make the consumer a better purchaser of agricultural products. These programs are sponsored by private groups as well as by agencies of the Federal and State governments, and it seems likely that a more effective job could be done in these programs of advising consumers if up-to-date information on conditions at retail were available on which to base this advice.

The purpose of this study is to determine whether or not it is practical to report retail price and volume information, to evaluate possible benefits from such reporting, and to find out what such a service would cost. An experimental retail market news reporting service was begun in Baltimore in July 1949, and continued through December 1950.

During the period of reporting, weekly reports covering 125 items were sent out to approximately 7,000 persons including consumers, retail store operators, wholesalers, processors, and farmers. These groups were then surveyed to determine the uses to which they put the information, and the results have been tabulated.

Consumers

Approximately 80 percent of the housewives receiving the report stated that they found the reports of use to them. They said that the report helped them (1) to substitute planned buying for impulse buying, (2) to judge better whether the individual items offered to them for sale in the stores were good buys, and (3) to check on grocers' prices in order to select stores from which to purchase food. One group of 150 housewives was asked to keep records of their purchases during the time that they received the experimental report. Their purchases during those weeks in which the products were listed in the report as "best buys" were compared with their purchases for the weeks in which the products were not listed as best buys. After adjusting the weekly purchases reported by weekly average consumption in the city, it was found that when consumers were advised that a product was a best buy and that in fact it was actually lower priced, they made substantial increases in the quantities they purchased. The amounts purchased as compared with normal weeks were as shown below:

Item	Percent that consumer purchases were of normal during best buy weeks
Beans, green	254
Beans, lima	170
Broccoli	154
Cabbage	140
Carrots	161
Cauliflower	178
Lettuce, iceberg	128

The size of these responses indicate that when consumers are properly advised and retail prices reflect supplies, that the consumers can and will do much to relieve conditions of accumulated supply that otherwise might result in distress prices to the farmer.

Many of the housewives reported that the retail market information enabled them to save money and at the same time to buy more and better food than before. This they did by more careful attention to the seasonal and individual store prices for individual items. Wide ranges in retail prices for individual items were found, with no single group of stores always having the price advantage. This range was so great as to exceed frequently the marketing cost of bringing the product to the retail store.

Retailers

Retailers were sent two types of reports. One gave only retail price information (fig. 5). The other compared wholesale and retail prices for fresh fruits and vegetables (fig. 6).

Of the independent grocers who received only the retail price report, 75 percent said that they used it. The most frequently reported uses were: To keep up-to-date with retail price changes, to keep in touch with the competitive price situation, and to convince customers that their prices were "in line" with other prices in the city. Many said they found that closer attention given to pricing their products in line with the information from the experimental reports helped keep all of their products moving. The independent grocers in the area outside of Baltimore reported greater use of the wholesale-retail price comparison report than those in the city and stated that it was useful as an aid in wholesale buying.

Wholesalers and Processors

The uses to which most of the wholesalers and processors were able to put the information were more general, such as providing a picture of what retail markets were doing, and as an indication of margin changes between wholesale and retail prices. The following proportion of each group reported using the information: 60 percent of meat slaughterers and producers; 29 percent of the dairy, poultry, and egg wholesalers; 94 percent of the fresh fruit and vegetable wholesalers; 22 percent of the canned goods wholesalers; 46 percent of the fruit and vegetable canners; and 57 percent of the frozen food processors and distributors.

Farmers

The farmers reported making very little use of the retail market news reports in their business operations. Their chief interest was in comparing wholesale and retail price changes and for general information. The small use made of these reports by farmers is apparently explained by the distance that the retail transaction is from the farm under modern marketing conditions. Only 23 percent of those in Maryland and Virginia who replied indicated that they found the data useful, and 40 percent of those from more distant shipping points indicated use of the reports.

Reporting Food Availability

In the reporting of prices in Baltimore it was found that with practically no additional expense, reliable estimates could be obtained on the proportion of stores in the city carrying individual food items. Surprising variations showed up in the week-to-week coverage of many items by retail stores--particularly the small independent store, and because food products cannot be sold unless they are offered for sale it is believed that this supplemental information could be used to provide a valuable indication of the kind of merchandising job being done in the city. Such information would also be useful in the timing of promotional efforts, because when supplies are not available in many of the stores, the effectiveness of a promotional program is lost on those housewives buying in these stores. The proportion of stores

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PRODUCTION AND MARKETING ADMINISTRATION
Marketing & Facilities Research Branch, 37 Commerce St., Baltimore 2, Md.
PLAZA 8460 EXT. 58 or 59

Vol. 11 No. 50 — RETAIL MARKET REPORT FOR BALTIMORE — December 13, 1950

ITEM	UNIT	WEIGHTED AVERAGE PRICES Last Wed.	This Wed.	CHANGE	80% PRICE RANGE
CANNED FRUITS					
Applesauce	303	15	16	+1	15-18
	2	16	16		15-18
Apricots	2½	34	33	-1	30-35
Fruit Cocktail	303	25	25		24-27
	2½	40	40		38-43
Grapefruit Juice	2	17	17		15-20
	46 oz.	38	38		33-45
Orange Juice	2	18	18		16-21
	46 oz.	41	40	-1	35-46
Blended Juice (O&GFT)	2	19	19		15-23
	46 oz.	40	40		35-47
Peaches	303	21	21		19-22
	2½	32	32		31-35
Pears	2½	44	45	+1	39-49
Cherries, RSP	2	27	27		22-33
CANNED VEGETABLES					
Beans, cut, green	2	16	17	+1	14-19
Corn, Golden cream style	303	16	16		14-19
	2	16	16		14-19
Corn, Golden whole kernel	303	17	17		17-19
	2	18	17	-1	11-20
	2 vac.	18	18		17-20
Peas, green, sweet	303	19	19		15-22
	2	18	17	-1	15-20
Spinach	2	18	18		16-19
	2½	22	22		20-25
Tomatoes	2	17	16	-1	14-17
	2½	24	24		21-29
Tomato Juice	2	14	14		13-16
	46 oz.	29	29		28-31
FROZEN FRUITS & VEGETABLES					
Orange Juice (conc)	6 oz.	24	24		23-27
Peaches	16 oz.	29	28	-1	25-33
Strawberries	12 oz.	48	48		45-50
Beans, cut, green	10 oz.	25	25		23-26
Beans, lima, fordhook	12 oz.	31	31		25-35
Peas, green	12 oz.	25	26	+1	25-26
Spinach	14 oz.	24	25	+1	23-26
Dried Prunes	lb.	26	26		25-29

Comments--Orange juice followed the trend of grapefruit juice with a one cent average decline on the 46 oz. size; canned peas averaged one cent higher following four weeks of steady prices. (See graph on back of sheet for prices of canned pears since May of this year.) Canned vegetables were generally steady with some shifts of corn, peas and tomatoes again this week. Frozen green peas and spinach averaged one cent higher this week, bringing both to the highest levels since August.

Frederick J. Poats
Local Representative

Note: This is the first of three pages of the report. The other pages carried price information on meats, dairy products, and fresh fruits and vegetables.

Figure 5.--First page of Baltimore experimental retail price report.

EXPERIMENTAL

UNITED STATES DEPARTMENT OF AGRICULTURE
PRODUCTION AND MARKETING ADMINISTRATION
Marketing and Facilities Research Branch, 37 Commerce St., Baltimore 2, Md.

Plaza 8460 Ext. 58

RETAIL AND WHOLESALE PRICES AND PRICE CHANGES FOR FRESH FRUITS AND VEGETABLES
Baltimore, Md.--December 13, 1950

COMMODITY	UNIT	WHOLESALE PRICES 1/			RETAIL PRICES 2/			DIFF. BETWEEN WHOL. & RETAIL	
		Range	Av.	Change from last week	Range	Av.	Change from last week	Av.	Change fr. last week
		---CENTS---							
Beans, B. V.	lb	22.0-23.7	23	+3	23-39	32	+2	9	-1
Beets	bun	7.6- 8.1	8		10-13	12		4	
Broccoli	bun	22.0-23.5	23	+2	25-35	31	+1	8	-1
Brussel Sprouts	qt	20.3-21.8	21	+1	25-33	29	+1	8	
Cabbage	lb	2.0- 4.1	3		5- 8	7	+1	4	+1
Carrots	bun	6.4- 7.4	7		10-15	12	-2	5	-2
Cauliflower	hd	19.4-22.1	21		25-37	31	+6	10	+6
Celery, white	bun	9.3-13.1	11	-3	15-28	21		10	+3
Celery, Pascal	bun	16.4-17.7	17		23-30	26		9	
Kale, loose	lb	5.0- 5.3	5	+1	10-15	12	+1	7	
Kale, prepkg.	pkg	15.0-15.0	15		19-23	20		5	
Lettuce, Iceberg	hd	8.9-11.7	10		14-21	18	-1	8	-1
Mushrooms	pt	20.0-22.0	21	-2	25-35	29		8	+2
Onions, yel.med.	lb	2.3- 2.8	2		5-10	7		5	
Onions, Spanish	lb	3.4- 3.7	4		8-10	9		5	
Onions, white	lb	9.4- 9.8	10		15-16	15	+4	5	
Parsnips	lb	4.5- 5.0	5		8-15	10		5	
Peas	lb	16.6-17.5	17	-1	23-30	26	+1	9	+2
Potatoes, East.	lb	1.5- 1.6	2	-½	3- 5	4		2	-½
" West. Bak.	lb	3.2- 3.5	3		6- 8	6		3	
Spinach, loose	lb	7.1- 8.3	8	+1	12-19	15	+3	7	+2
Spinach, prepkg.	pkg	17.5-17.5	18	+2	21-25	24	+1	6	-1
Sweets, golden	lb	3.8- 4.5	4	-1	7-12	9		5	+1
" Puerto Rican	lb	3.8- 6.0	5	+1	8-11	9		4	-1
Tomatoes, loose	lb	15.2-15.8	16	-1	20-23	27	+4	11	+5
Tomatoes, carton	pkg	15.0-20.0	17	-1	23-33	26	+2	9	+3
Turnips, white	lb	2.6- 3.1	3	+1	5- 9	7		4	-1
Turnips, rutabagas	lb	2.7- 3.0	3		4-10	7		4	
Apples, East.	lb	4.4- 7.0	6		8-15	11	+1	5	+1
Apples, West.	lb	5.8- 9.0	7		12-15	14		7	
Cranberries	lb	9.3-12.5	11		19-22	19		8	
Grapefr.54,70,wh.	ea	4.3- 5.2	5		8-15	10	+1	5	+1
Grapes, red	lb	9.5-10.7	10		15-20	17	+1	7	+1
Lemons, 360	doz	21.8-25.0	23		39-50	45	+1	22	+1
Orange,Fla.176&216	doz	21.0-23.5	22	+1	29-50	37		15	-1
Pears,Bosc D'Anjou	lb	7.6-10.8	9	-1	15-18	16		7	+1
Tangerines,120&150	doz	33.4-37.2	35		39-60	52		17	

1/ "Mostly" prices for Monday, Tuesday, and Wednesday as reported by Federal State Market News Service converted into retail units and rounded to the nearest whole cent. The average is estimated on the basis of available knowledge as to prices within the "mostly" range at which the largest quantities were sold.

2/ Retail prices are quoted as of Wednesday for a representative sample of stores and market stalls throughout the metropolitan area.

JAMES C. KELLAM
Marketing Specialist

FREDERICK J. POATS
Local Representative

Figure 6.--Baltimore experimental report comparing wholesale and retail prices.

carrying California oranges (weighted by size of store) is shown below for the period May through October 1950:

	Percent		Percent
May 3	43	August 2	45
May 10	43	August 9	51
May 17	43	August 16	49
May 24	45	August 23	51
May 31	43	August 30	55
June 7	42	September 6	53
June 14	24	September 13	51
June 21	23	September 20	57
June 28	32	September 27	58
July 5	36	October 4	77
July 12	40	October 11	77
July 19	49	October 18	72
July 26	53	October 25	70

Reporting Volume of Sales at Retail

Practical methods of collecting volume-of-sales information on 40 items from retail stores were worked out by gathering information on store purchases, taking store inventories, and then computing net sales. Variations between stores sampled, however, were found to be such as to make reliable estimating of volume of sales from a sample of stores impractical on an individual city basis; but it was found that bimonthly reporting of volume on a regional or national basis would be quite practical. Judging from the Baltimore experience, national estimates of volume of sales for individual commodities could be supplied with a sampling error of as little as 5 percent from a sample of 400 to 500 stores. Regional estimates of volume of sales for individual commodities could be supplied with a sampling error of only 10 percent from a sample of 130 to 150 stores.

STUDYING THE ADEQUACY OF THE DEPARTMENT'S GRADING AND INSPECTION PROGRAMS

Extent of Use of Grading and Inspection

As a basic or first step in evaluating the adequacy of the Department's grading and inspection program, a review has been completed of the amount of use being made of the grading and inspection program for fresh fruits and vegetables and its historical growth. Past records were searched and information was brought together on the amounts of fruits and vegetables for fresh use inspected by years since 1917, when the program was started, and the amounts of fruits and vegetables for processing use inspected by years since 1931, when that program was begun. The data were tabulated by individual commodities and by States, and the extent of use of inspection and grading was shown in relation to the sales of the individual commodities both for fresh use and for processing. Not all of the inspections of fruits and vegetables are made according to the U. S. grade standards. The inspector certifies

that the grade of a lot is as specified, and this grade may be a U. S. grade or State grade, or possibly may be based on specifications laid down in a private contract.

It was found that although the program of inspection and grading of fruits and vegetables for fresh use has increased continuously, it has not much more than kept pace with increased production. The volume of fruits and vegetables for fresh use that is not inspected is almost as large as the volume that was not inspected at the time the program was begun. Most of the progress has been in the more recently developed and large-scale producing areas, most of which are a considerable distance from the major consuming markets. This points out the need for more attention to grading problems of producers in the older producing sections near the markets.

There has been a steady rate of growth of commercial inspection at shipping points, but much of the increase in recent years is accounted for by the use of grades and other quality regulations in marketing agreements as well as the Federal purchases for price support and military and other Government uses. The volume of inspection of fruits and vegetables for fresh use at receiving points increased from 1917 to 1921 and then held fairly constant until 1930, when there was a big increase. This service has not grown since 1930, and in 1949 it made up only 5 percent of total inspections. A breakdown of the total fruits and vegetables inspected for fresh use in 1949 showed that the commodities inspected in greatest volume were potatoes, which made up 51 percent; oranges, 9 percent; apples, 5 percent; and grapefruit, 4 percent.

It was shown that the inspection of fruits and vegetables for processing use has not kept pace with the rapid increases in sales for processing, but has made substantial growth. In 1949, 29 percent of all fruits and vegetables sold for processing were inspected. Sixty-one percent of this amount, however, were the Florida citrus fruits, which are now required by State law to be Federal-State inspected. Of the total fruits and vegetables inspected for processing in 1949, 6 commodities made up 91 percent: oranges, 40 percent; tomatoes, 22 percent; grapefruit, 15 percent; apples, 6 percent; pears, 5 percent; and cherries, 3 percent. Twenty other commodities inspected made up the remaining 9 percent.

Relations of Price to Quality and Variations in Grade Application

Two technical studies, completed last year, were rewritten to make them suitable for more general use. One deals with the relation of quality to market price as measured in U. S. and commercial grades for poultry. The other shows the kind and extent of variations in grade application found among graders in the grading of poultry.

Basic Principles in the Development of Standards for Grades

During the year a continued review was made of the principles underlying the development of standards with particular attention being given to an evaluation of

the changes in principles that have been followed in the development of standards in relation to changes that have occurred in marketing methods. This review involves a study of the history of the development of standards, including the early Congressional debate and consideration at the time the grading and inspection program of the Department was initiated, and the gathering of information from members of the grading and inspection services of the Department. A paper was prepared on this subject.

MISCELLANEOUS ACTIVITIES

POTENTIAL MARKET OUTLETS FOR MOHAIR

The study designed to measure the possibilities of increasing the demand for mohair was completed during the year, and the report which has been written is now being reviewed in order to place it in proper form for publication. This report describes the mohair industry; the trend in the uses of mohair; the types of uses made of the fiber; factors affecting mohair prices; technological conditions affecting potential outlets; problems in connection with specific uses of mohair; the development of experimental yarns, fabrics, and products during the study; and trade and consumer reaction to these experimental products, and concludes with the market potentials for the fiber. This report shows that substantial inroads have been made by competing fibers into the traditional markets for mohair, such as automobile upholstry and hair-cloth, but that it should be possible to recover a substantial part of the market in some of these uses. It also points out several new outlets for the fiber which offer distinct possibilities of materially broadening its base utilization.

APPRAISAL OF THE EFFECTS OF TECHNOLOGICAL CHANGES ON AGRICULTURAL MARKETING

Representatives of this Branch have been working with the Bureau of Agricultural Economics, the Agricultural Research Administration, and other agencies in an appraisal of the changes in agricultural marketing which have resulted from technological developments. This Branch had the responsibility for gathering and analyzing the data in most fields with the exception of the historical background, food processing, and developments in the home. The chapters of the report for which the Branch had responsibility was completed during the year and turned over to the Bureau of Agricultural Economics for inclusion in the over-all report, for which that agency has taken primary responsibility. This report will show that the marketing system for farm products has undergone a major revolution during the first half of this century and that the marketing structure is being materially changed for adaptation to truck transportation, a new network of speedy communications and information, new forms of retailing, and changes in food habits brought about by new methods of urban living, better incomes, and new developments in food technology.

LIST OF PUBLICATIONS RELEASED, OR ABOUT TO BE RELEASED, BY THE MARKETING AND FACILITIES RESEARCH BRANCH

1. The wholesale market for fruits, vegetables, poultry, and eggs in Jackson, Miss.
2. The wholesale market for fruits, vegetables, poultry, and eggs in New Haven, Conn.
3. Supplement to a report entitled "The wholesale market for fruits, vegetables, poultry, and eggs in New Haven, Conn."
4. The wholesale fruit and vegetable market of Miami, Fla.
5. The wholesale fruit and vegetable markets of Tampa, Fla.
6. The wholesale markets for fruits, vegetables, poultry, and eggs in Atlanta, Ga.
7. The wholesale market for fruits, vegetables, poultry, and eggs in Hartford, Conn.
8. The wholesale market for fruits, vegetables, poultry, and eggs in Columbus, Ohio.
9. The wholesale market for fruits, vegetables, poultry, and eggs in Baton Rouge, La.
10. The wholesale market for fruits, vegetables, poultry, and eggs at Richmond, Va.
11. The Benton Harbor fruit market at Benton Harbor, Mich.
12. The wholesale market for fruits, vegetables, meat and meat products, poultry, eggs, and other produce at Houston, Tex.
13. The Columbia, S. C., produce markets
14. The wholesale markets for fruits, vegetables, poultry, and eggs at Greenville, S. C.
15. Concentration markets for fruits and vegetables in Sumter and Lake Counties, Fla.
16. The wholesale produce market at St. Louis, Mo.
17. The wholesale markets for fruits, vegetables, poultry, and eggs in Greater Little Rock, Ark.
18. The wholesale produce market at Milwaukee, Wis.
19. The wholesale market for fruits, vegetables, poultry, and eggs at Savannah, Ga.
20. The wholesale markets for fruits, vegetables, poultry, and eggs at Tulsa, Okla.
21. The wholesale produce market at Indianapolis, Ind.
22. The Raleigh, N. C., produce markets
23. The wholesale produce market at Norfolk, Va.
24. East Texas produce markets and plans for new markets at Tyler and Jacksonville, Tex.
25. The wholesale produce markets at Boston, Mass.
26. Wholesale market for fresh fruits, vegetables, poultry, and eggs in Louisville, Ky.
27. The wholesale produce market at Huntington, W. Va.

28. The Central Retail Food Market of Cleveland, Ohio

29. The wholesale produce market at Winston-Salem, N. C.

30. The wholesale produce market at Nasheville, Tenn.

31. The San Antonio, Tex., produce markets

32. The wholesale produce market at Asheville, N. C.

33. Marketing facilities for farm and related products at San Juan, Puerto Rico

34. The wholesale produce market at Beckley, W. Va.

35. The wholesale produce market at Waco, Tex.

36. Some plans for new market facilities for the wholesale handling of produce in Philadelphia, Pa.

37. The relation between locker plants and home freezers in the distribution of frozen foods in Arizona (part I)

38. Farmers' produce markets in the United States (part I - history and description)

39. Marketing frozen foods--facilities and methods

40. Wholesale poultry and egg markets in 30 cities

41. The comparative efficiency of various arrangements of railroad tracks at stores in wholesale produce markets

42. How fresh fruit and vegetable distributors can get more out of their materials-handling equipment

43. Use of recording and transcribing equipment in loading delivery trucks of produce wholesalers

44. An improved method of stacking standard density bales of cotton in "cordwood" arrangement

45. A comparison of two-wheel hand trucks and clamp-type industrial trucks for transporting uncompressed bales of cotton from blocked area to dinky press

46. An evaluation of the use of the portable platform dial scale for weighing operations in cotton warehouses

47. Some improved methods for receiving bales of cotton in compresses and warehouses

48. The check-out operation in self-service retail food stores

49. The grocery operation in self-service retail food stores

50. Marketing Florida prepackaged sweet corn

51. Prepackaging apples at point of production

52. Prepackaging spinach and kale

53. Retailing prepackaged meats

54. The costs of and reasons for rewrapping prepackaged meats

55. Consumer buying practices and preferences for purchasing oranges by weight or count, in selected cities

56. Package and bulk selling of Florida oranges

57. Merchandising reconstituted frozen concentrated orange juice through the use of mechanical dispensers

58. Test of refrigerator car equipped with split-absorption system of refrigeration

59. Transportation of frozen citrus concentrate by railroad and motortruck from Florida to northern markets

60. Transportation test of dry ice refrigerated truck trailer--Florida to Chicago--May 1951

61. A comparative study of packing, transportation, and refrigeration costs of bushel baskets and wire-bound boxes for transportation of peaches

62. Reduction of loss and damage in rail transportation of shell eggs by improved loading and bracing

63. Loss and damage in rail transportation of watermelons

64. Reduction of cantaloup loss and damage in rail transportation through use of the upright loading method (an interim report)

*65. Program analysis--improving the effectiveness of wholesale market news services

*66. The market news reporting job

*67. Reproduction of market news reports

*68. Improving the reading ease of market news reports

69. The market news services of the U. S. Department of Agriculture

*70. Uniform terminology for all market news services

71. Prices received by Iowa creameries for butter (weekly report, issued during period September 1949 to September 1950)

72. Terms used in livestock market news

*73. Program for development of the market news service

*74. Summary of program for development of the market news services

*75. The relative prices paid creameries for 91-score and 90-score butter

76. Use of USDA livestock market news by northeastern slaughters

77. Extent to which receivers of mimeographed livestock market reports also use livestock reports in newspapers and over radio

78. Uniformity in reporting market news information between markets--
Part I - Butter
Part II - Cheese
Part III - Shell eggs
Part IV - Frozen and dried eggs
Part V - Live poultry and rabbits
Part VI - Dressed poultry
Part VII - Dairy products other than butter and cheese

79. Reporting butter prices received by creameries

80. What does the Iowa farmer want from radio market news?

81. What does the Iowa farmer want from newspaper market news?

82. How does the Iowa farmer obtain and use market news?

83. A national sample for retail market news

84. Retail market report for Baltimore (weekly report, issued during period July 1949 to December 1950)

*85. Baltimore frozen food survey (monthly report, issued during period September 1949 to August 1950)

86. Retail and wholesale prices and price changes for fresh fruits and vegetables (weekly report, issued during period March 1950 to December 1950)

87. Retail market news as an aid in the marketing of food products

88. The market information needed on frozen food

*89. List of terms used to designate U. S. grades

*90. Relationships between USDA standards and Federal specifications for dairy products

91. Grade terminology used in USDA standards

*92. Form of presentation for USDA standards for grades

93. Index of USDA standards for agricultural commodities

94. Variations in State standards and grades for eggs

*95. A study of commercial and U. S. poultry grades in relation to market acceptance

*96. A study of the variations by graders in rating quality

*97. Extent of use made of Federal and Federal-State inspections of fresh fruits and vegetables

98. Principles and practices in the development of standards for grades for agricultural products

* Copies not available for distribution